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Renewable Energy Market Analysis in Nigeria

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Abstract

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Year 2012 Pages 110

This thesis project research was conducted as part of the CONNECT project at Laurea University of Applied Sciences. The project concerns the investigation of the current renewable energy market entry and opportunities for Finnish small and medium-sized enterprises (SMEs) in the Nigerian economy. The goals is to support growth and accelerate the internationalization of small and medium-sized Finnish renewable energy companies within developing countries and to determine how they can achieve market entry in the renewable energy resource business in Nigeria.

There is great demand for electricity in the country due to its high consumption, and this thesis will study the demand for renewable energy resources in Nigeria, identify the main competitors and discover the best periods for market entry in Nigeria.

A qualitative method of analysis was used in this thesis project, and a questionnaire survey was sent to three energy organizations in Nigeria. These included the International Centre for Energy, Environment & Development; the Energy Commission of Nigeria (ECN); and the Council for Renewable Energy in Nigeria.

The investigation of this thesis project provides information needed to establish renewable energy in rural and urban areas in Nigeria. The Nigerian government is encouraging energy companies to invest in the country and special energy policies for foreign investors have been organized, such as a tax reduction plan for energy investors, and the relaxing of energy policy.

Nigeria is a nation with great potential for renewable energy solutions, such as sunlight which might be productive for solar power solution, and plentiful bio-waste for biomass energy production. The renewable energy solutions that Nigeria requires most are solar power, hydropower, wind power, and biomass energy power and the best solution for the energy crisis in Nigeria is through the use of solar power solutions.

Key words renewable energy, energy situation, load shedding schedule, energy policy, market entry, operating environment.

Table of Contents

1 Introduction

The Project research was conducted to the CONNECT project of Laurea University of Applied Sciences. The process deals with investigating the current renewable energy market and situations for Finnish SMEs business investors in Nigeria.

There is higher demand for electricity in the country due to the high consumption and need for electricity, and this project is the plan to study the demand for renewable energy resources in Nigeria and to find out the main competitors and discover the best periods for market entry in the country via the micro and the macro environmental analysis.

The Nigerian government is wooing energy companies to come and invest in the country. Special energy policy for foreign investors is being organized, such as tax reduction for energy investors in the country, softening all policies related to energy.

Nigeria has a lot of renewable energy potential such as sunlight, which might be productive for solar power, and abundance bio-waste for biomass energy production. The renewable energy products that Nigeria requires most are Solar, Hydro, Wind, & Bio-energy.

1.1 Objectives and Research questions

The objective of the thesis is to contribute to the CONNECT project research by analyzing the discovering operating environment of investment and business in the energy sector of Nigeria, i.e. to know if the Finnish SMEs companies can invest in the country and the possibilities of renewable energy market entry in Nigeria and how to helps the inter-nationalization of the Finnish Small and Medium scale Enterprises (SMEs) to invest in Nigeria.

The research questions of the thesis are based on the operating environment of investment and business in the energy sector of Nigeria. The key research questions are as follows:

Is it advisable for the Finnish renewable energy companies invest in Nigeria?

What renewable energy sources have a better potential to be a growing and developing investment in Nigeria?

1.2 Methodology

The method used in thesis projects is qualitative research method, which can be refers as scientific researches that consist of investigation that collect evidence, produce findings that are undetermined in advance, need answers to a question, producing information's that are application beyond the immediate areas of study and use a predefined set of procedures to answer the question.

It is also important for information collections to maintain clear boundaries between information they received by the participant and what they ask the participant. Furthermore, questionnaire was carefully prepared and directed to renewable energy NGO's (International Centre for Energy, Environment & Development and Council for Renewable Energy in Nigeria) and the Nigerian government organization called the Ministry of Energy. The questionnaire was vital for the aims and objectives of the thesis as part of the CONNECT project requirement. Majority of the questions asked were related to the PESTELS factors.

The questionnaire format is related to questions based on suggestions, energy situation and government incentives and support in establishing a company in the Nigerian market.

The questionnaires are based on their understanding of the energy situation, the availability of renewable energy resources, the level of energy competition companies in the country, the economic and environmental competitive, which were sent to them, via their email address and there was also a follow up by telephone in other to hastening them for responses.
The investigation of this thesis project provides information needed to establish renewable energy in the rural and urban areas that are in need of energy in the country.

Literature reviews is still part of the methodology used in the PESTEL analysis of the project where information are being gathered from different sources, documented, evaluated and presented.

1.3 Key definition

Renewable energy can be refers to as a natural energy at which its energy supply is limited. Renewable energy can never run and can be used again and again.

Renewable energy has been in use for so many years in different ways. An example is how the primordial human used the application of wind for sailing; rather the same wind is now used for electricity generation in the modern era.

Some of the renewable energy resources are as follows. Wood, Biomass, Wind, Hydro, Wave, geothermal, tidal and solar. (Clean Energy Ideas, 2012)

1.4 Structure of the thesis

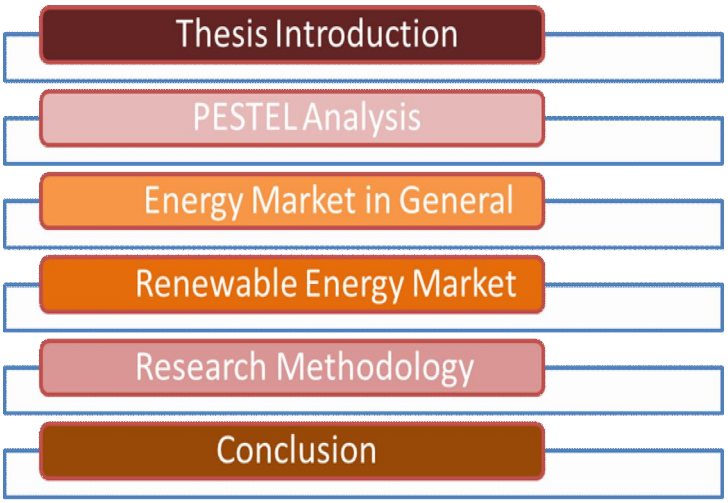


Figure 1 Thesis structure

The Introduction and Objectives of the thesis was described in chapter one. In chapter two, PESTEL analysis of Nigeria has been examined. In chapter three, the energy market situation in general and rates of demand and supply was analyzed. In chapter four, the renewable energy market demand, its vital resources have been concluded. In the chapter five, research method analysis was conducted via interview questions to different organizations related to renewable energy business.

2 The Business Operating environment in Nigeria (PESTEL Analysis)

The PESTEL factors consist of the Political, Economic, Social, Technological, Environmental and Legal. It is a strategic technique that gives useful information for analyzing the environmental tension in a particular environment. For example, in this project, it means to analyze the Nigerian business operating macro environment for renewable energy opportunities.

Figure 2: PESTEL analysis

Political Factors refers to changes in government impact, its priorities for the Nigerian relationships with other countries which closes or open the market bond between them which includes the forms of government, bureaucracy, international relationship, corruption, public ownership right and many more.

Economy factors refers on how the economics of a particular place can affect business such as changes in wage rate, inflation, Economic stability, employment rate, labor force, division of income.

Social Factors refers to changes in trends which include lifestyles, behavior, attitude, business culture, cultural changes, family change, demographics and expectations.

Technological factors refers to as the level of technology in Nigeria which will helps with the introduction of renewable energy solution in the country which Includes, electricity, infrastructures and modern communications.

Environmental factors includes geographical sites and locations, climatic changes, natural resources related to renewable energy solutions, level of infrastructures, Public opinion, cost implications and frequency of environmental catastrophe.

Legal factors includes the Nigerians rules and regulations related to energy, Ecowas and African union legislations and Nigeria directives

2.1 Political factors

2.1.1 Politics and Administration

Nigeria is a republic nation which operates a Federal system of government, with three different authorities- The Federal, State and the Local government. The division of power is among the three arms of government. The Federal Government consist of the Judiciary which interprets the laws, for examples supreme court, court of appeal and the district court; the executive enforces and carry out the laws, for example federal and the legislature makes the laws for example senate and house of representative.

The state government consist of (36 States including the Federal Capital Territory Abuja) some of the states in the northern Region consist of Kano, Kaduna, Sokoto, Borno, Adamawa, Katsina, Gombe, Zamfara and others can be shown on the map. The western region consists of Lagos, Ogun, Ondo, Osun, Ekiti, Oyo, Kwara etc. The states in the South and East consist of Abia, Bayelsa, Delta, Anambra, Rivers Imo; Enugu (Teach anywhere 2009).

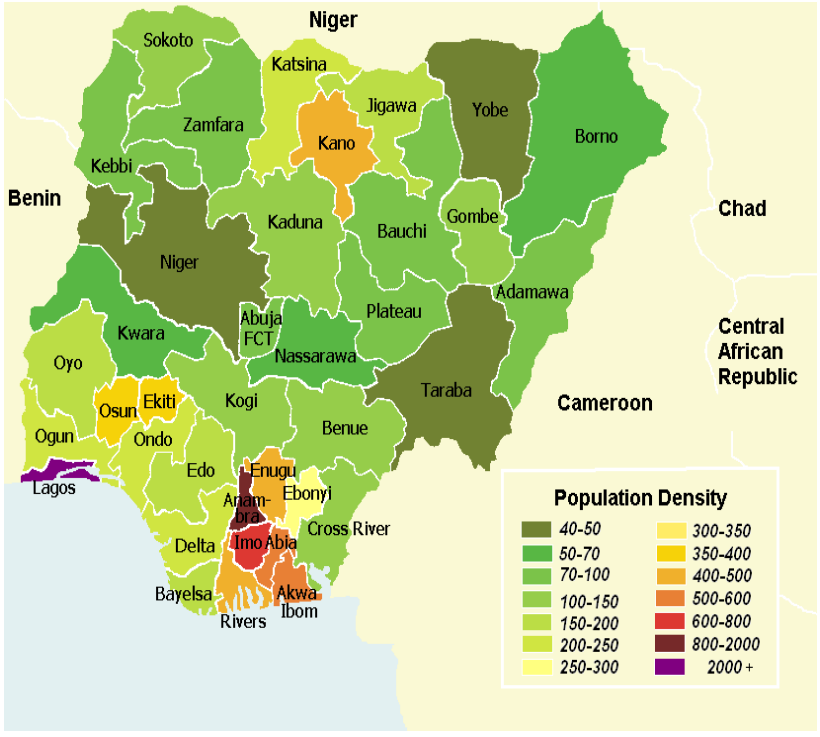


Figure 3: Map of Nigeria

The Nigeria government consists of 774 local government areas (CIA 2012).

The political terrain is becoming attractive to business in Nigeria since the country became a democratic system in the year 1999. For the past 13 years, Nigeria has been experiencing an uninterrupted democracy and the latest election was held from the month of April to June 2011 which was a democratic form of choosing a representative to the Nigerian government and its various states.

Those elected on the federal level are the head of states (The President and Vice President) and legislature system which is (National Assembly). The Nigerian President is elected by the People via election voting system. The national assembly is a form of two chambers, House of Representatives with 360 seats and the Senate which has 109 seats and all are elected for a four years term each.

The political terrain is becoming positive except for the northern region of Nigeria that is experiencing instability due to religions unrest, security operatives are deployed to the region in other to neutralized the situation and the government have begun in negotiating with the religious crisis cabals (BOKO HARAM) in the northern region in other to address the annoyance of the group which will improve the business day to day in the region.

The southern region of Nigeria is very suitable for businesses day to day which control the economy power of the country.

2.1.2 Government Policy

The government policy in Nigeria varies in different situations, for example changes in government regime every four years. According to the Industry analysis in Nigeria, government policies usually have a great impact.

For example, starting a form of business in Nigeria from Finland or any country, once the government opens their interest to anything that is related to yours business, you will have to change your business model or your company competitive advantage will be declining in no time. So you will need to understand the government structure, find and work along with a politician's parties, individuals, politicians, public consultant and Lobbying decision makers in government that can represent your company interest.

2.1.3 Central and Local Government Arrangements

The central and Local government system of doing business in Nigeria is arranged in a way whereby for a company start business in a state region, they have to inform the local government of the state and do the necessary steps, and the local government will inform the central government which is the state government about the registration and investment of the new company in the state.

2.1.4 Bureaucracy

Bureaucracy is one of the problems being faced in Nigeria, over the last decade the bureaucracy acts is declining and despite the continuous act of bureaucracy and corruption the international business community drastically sees Nigeria as a central blueprint of a vast African market that remains the least under-developed commercials market in the world and the current government administrations decided to focused on developing the non-oil economy and controlling red tape and corruption acts which give foreign companies assurance that potential can be turn into a reality. (Trade Investment Nigeria 2010)

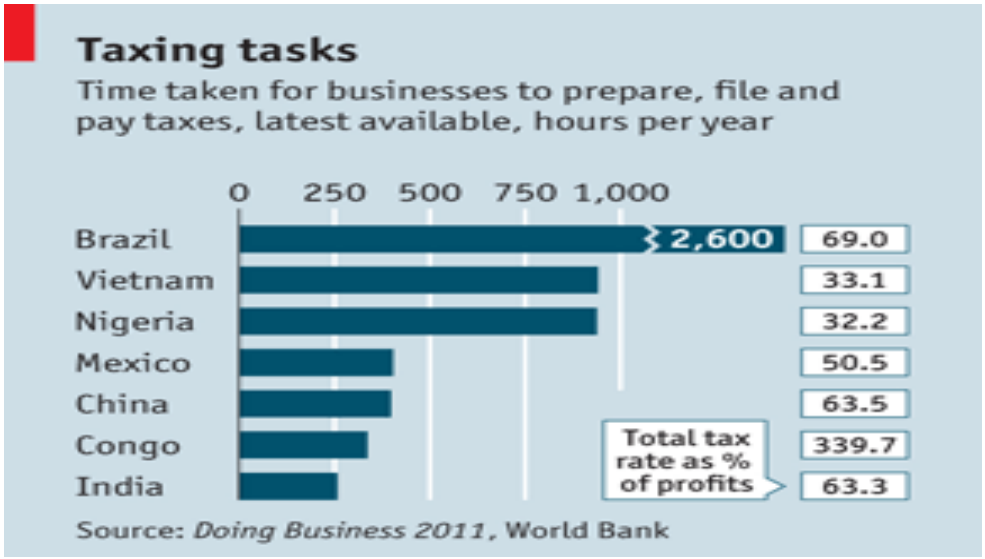


Figure 4: Taxing Task
Source:Doing Business 2011 World Bank

2.1.5 International Relations

Nigeria is the leading country and the largest economy in West Africa with its natural land human resources.
It also has the potential to become the region powerhouse for economy growth. Nigeria is the largest population in Africa 170 Million is one of the founders of the Africa Union (AU) which was formerly called Organization of Africa Unity created in the year 2002. (CIA Fact 2012)

It is the engine of West Africa with the creation of the (ECOWAS) Economic Community of West Africa State in the year 1975; Nigeria has taken the responsibility of the conflict solution in many West African civil wars for examples, Liberia, Sierra Leone, Sudan, Sao Tome, and Ivory Coast. It has become an important country for international conference centers in the recent years hosted by a number of large international conferences like AU, Commonwealth Summits and the ECOWAS summit which is usually located in Lagos and Abuja. Nigeria joined the United Nation in the year 1970.

Nigeria is an important country to the European Union politically and economically. Nigeria plays a major role in exporting petroleum and agricultural products to the European countries. Nigeria also plays a major role in importing European Products.
(Ambassador Ollikainen 2000)

Nigeria became a member of the United Nation (UN) Security Council on 1966 – 1967, 1978 – 1979, 1994 – 1995, and 2010 –2011, Nigeria also has a diplomatic relationship with more than 150 Countries, and it is among other member of some non-regional agencies like ILO, WHO, FAO, G-15, G-57, G-24.

2.1.6 Corruption

According to Corruption Perception index (CPI) report which stated that corruption in Nigeria shows to have slightly improved but is still the main problem of the country growth and development which discourages investment outside the oil sector.

Corruption had been one of the key issues in Nigeria, which declined growths and developments in all sectors "in the Nigerian economy", for examples, Fraud, Bribery, Lobbying for personal interest, nepotism and graft are the key factors that affect the increase in growths and developments of the country.

Since the introduction of Economic and Financial Crimes commission in the year 2004, by the former President Olusegun Obasanjo, many corrupt individuals have been arrested and jailed after being found guilty and the crime agencies are vibrantly working in tacking the corrupt acts in the country.

According to Corruption index 2011 from Transparency International, Nigeria has been removed from the top 20 most corrupt country in the whole world, due to her government fight for corruption.

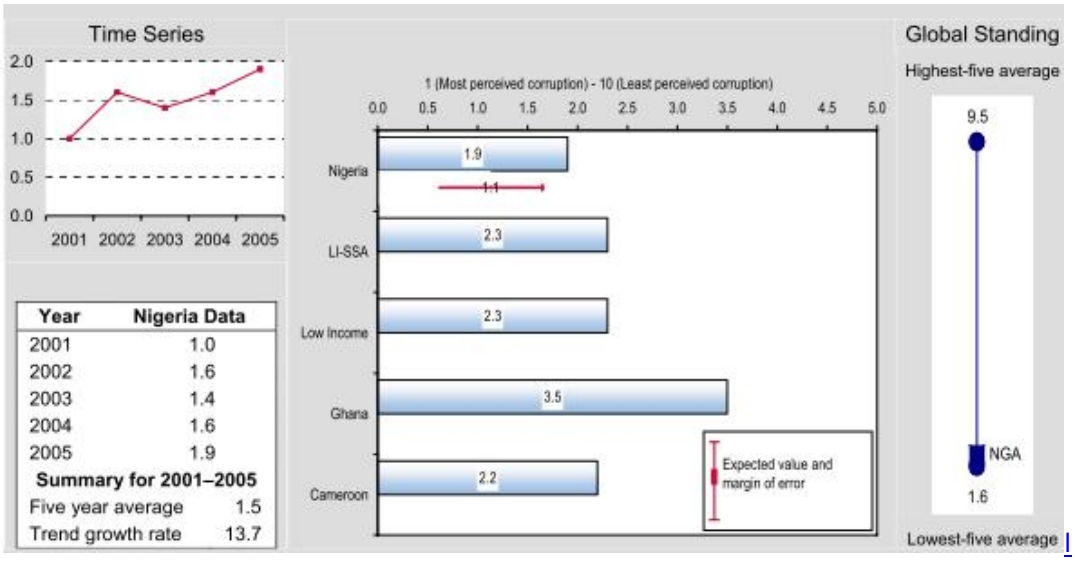


Table 1: Corruption Perception Index
Source: Transparency International/UnAid

2.1.7 Public ownership

In Nigeria, there are no restrictions of public ownership of local companies and businesses. Foreign investment is actively allowed both in private and public sectors in the Nigerian economy. Nigerian economy has a free-based market environment, with some areas being control by the state. According to the World Bank, "Nigeria is among the most open countries to foreign ownership in the Sub-Saharan Africa region. All the industry sectors are 100 percent open to foreign capital participation. Banking industry is the only exception, in which 40% is the maximum share allowed to be acquired by foreign investors in any of the existing Nigerian bank" (World Bank 2012)

2.1.8 Environmental policy

In the 1999 constitution of the Nigerian government policy on environmental, its state to improve, empowered and protect the environment, safeguard the forest and wildlife, water and the air and land of Nigeria.
They also state that the private and public sector in the Country economy will not authorize project activities without considering the effect of their plan in the environment. States and local government also set their own environmental rules and regulations for the protection and development within their state.

Investors must make an agreement with the three government bodies (federal, state and local government) before any freedom of energy activities or operation can begins at any targeted region. There are laws and regulations enforcement bodies that planned to safeguard the environment by the federal government of Nigeria. (Aluko & Oyebode, 2007)

2.1.9 Taxation policy

According to the English Webster dictionary, it defines 'Tax' as a Charge imposed by the government authority to individuals, property and transaction to generate fund for public uses. Paying tax in Nigeria is imposed mainly on groups and not individuals. In Nigeria taxation rate is minimal and Oil Company's tax varies.

The tax policy in Nigeria has been ineffective for years. It added to the reduction of the economy growth due to its administrative burden, Compliance Burden, lack of equality and poor taxation zeal from the government.

These challenges make difficult to know the amount Company's pay in taxes and how the tax payment is prepared. According to NTP, An introduction of a new tax policy in Nigeria by the National Tax Policy (NTP) was set to provide firms that will focus on tax policy and improve it efficiency by introducing rules and regulations for paying tax in the country which will enhance a friendly environment for doing business in Nigeria. FIRS (Federal Inland Revenue Service) were the new body that is being introduced to develop and enhance the taxation policy in Nigeria, where policy will be followed with tax compliance requirements that will be needed to comply by all companies before the approval of investment in the country.

This new taxation policy provides a new tax system operation by recognizing the responsibility, obligations and roles of all stakeholders in Nigeria tax system. This new system that is being introduced will reduce any difficulties of tax payment in Nigeria for local and international investors. It will also reduce the level of corruption in the tax system. Nigeria Econo-

mies ranking on the ease of tax payment is at 138 out of 183 which are still behind countries like Ghana and South Africa.

According to the Leadership Newspaper on the 11th of May, 2012, at the chartered Institute of Taxation of Nigeria (CITN) 14th Annual Tax in conference in Abuja with the theme called 'Taxation as a Tool for Economic Transformation.

The Nigerian president Good luck Jonathan the government has strategies to diverse the country sources of revenue by strengthens the tax policy. He also stated that strengthen of tax policy in the country will reduce or even eradicate the Nigerian dependency on oil revenues to weaken the tax policy for the past decade. He also said production activities in other sector will be encouraged by changing the situation. According to Doing Business (2012,70), An average of 35 tax payment per year with 938 hours of filing per year and preparation; and payment of taxes is a total of 22.3% profits in Nigeria.

INDICATOR	DB 2006	DB 2007	DB 2008	DB 2009	DB 2010	DB 2011	DB 2012
RANKING	n/a	n/a	n/a	n/a	n/a	109	138
PAYMENT (Number per year)	35	35	35	35	35	35	35
TIME (Hours per year)	1,120	1,120	1,120	938	938	938	938
Total tax rate (% of profit)	31.5	32.2	32.2	32.2	32.2	32.2	32.7

Table 2: Doing Business, Nigeria) the ease of paying taxes in Nigeria over time
The Diagram below shows the rank of Nigeria on the ease tax payment compared with other countries in the list from 2006-2012

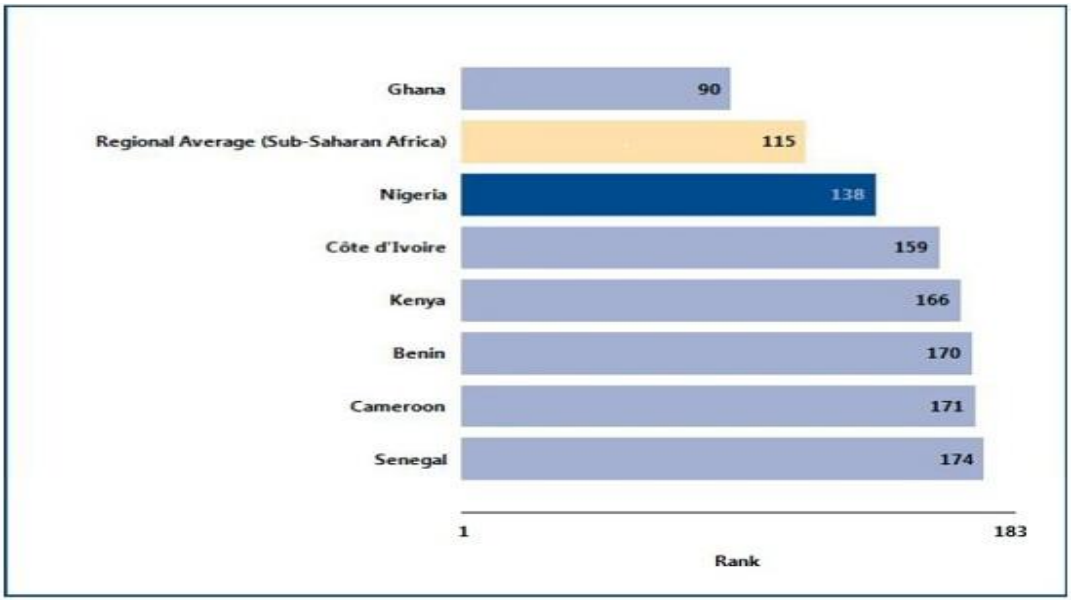


Figure 5: Doing Business database
Source: Doing Business database

2.1.10 Role of NGOs and community initiatives

NGOS and other community initiatives acted a long role in Nigeria communities. NGO is a freelance system. In Nigeria NGOs is always allowed to operate as it is not sponsors by the government but by individuals. This has made an outstanding impact in different sectors of the entire system for examples Health, Energy and Agriculture. According to the NGO Council order for renewable energy for Nigeria (CREN), they are non-profitable multi-stakeholders associations which develop and promote the substantial use of renewable energy technology in Nigeria.

They cooperate with stakeholder in discuss the challenges of availability, cost, awareness and appropriate implementation in Nigeria. They create foster emergency available for economic value via, renewable energy system for public awareness.

There are also many others NGOs are mainly involved in the renewable energy in Nigeria which were sponsored by international NGOs. NGOs play crucial roles in encouraging and helping the Nigerian government by taking actions that have been endorsed by the international community. NGOs have been important factors before, after or during the Nigerian government decision making period. These are lists of Roles of NGOs and Community initiatives in Nigeria.

Communication with Formal Private Sector
Communications with the State Government
A Healthy State-NGO Partnership
Foster an enabled environment in the country.
Ingredients of an enabling environmental policy

2.1.11 Relationship between Nigeria and Finland

The republic of Finland is a Nordic country that is located in the northern part of Europe.it has borders with Norway in the north, Sweden in the west, Estonia in the south across the Gulf between Finland and Russia in the east. Its economic development grows speedily in the last two decades. It's well balanced and extensive welfare between the east and the west in global politics and economics is the main characteristics of Finland, whose rank the country among the most Competitive, livable and peaceful country in the world.
(Finland Wikipedia 2012)

Finland recognized Nigeria on the 7th of October 1960 after Nigeria got independent from the United Kingdom. The diplomatic relationship between Finland and Nigeria started on 18 January 1963. (Ministry of foreign affairs of Finland 2006)

In March 2009, former Finnish President Madam Tarja Halonen visited Nigeria with 14 delegations to discuss developing a strong bilateral agreement between the two countries.
After meeting with the Late Nigerian President Umar Yar'Adua, she stated "The subject the interest to both countries is based on environmental issues, and we also want to know what can benefit and exist in both countries and how the technical knowhow will be used to meet the need in other to solve them" (Tarja Halonen 2009)

The Late Nigerian President Umar Yar'Adua stated "Finland has developed renewable energy and it excelled in tackling the problems of pollution and environment and these are problems and issues that Nigeria presents it for investment in these areas.
The business and trade relationship between Finland and Nigeria got boosted when the President, His Excellency Dr. Goodluck Jonathan who was the Vice President then; led a Nigerian business delegation on an official state visit to Finland and was followed by the Finnish Minister for Foreign Trade visit to Nigeria in May 2009. (Finpro 2009)

The introductions of business trade, partnership, and investment between Finland and Nigeria have been instigated by the Finland–Nigeria chamber of commerce which brings positive business opportunities in both countries.

According to Finpro webpage, Active trading begins in the year 2006 between Finland and Nigeria in importing and exporting of products such as paper and plastic products, sound and telecommunication equipment's, power generating equipment's, transport equipment, machineries, mineral manufactures and many more.

Finland open an official trade Centre (FINPRO) in Abuja, Nigeria in the year 2010 after the Minister for Trade of Finland came to Nigeria for a strong business relationship bond between the countries.
Finpro is a global expert organization that helps in promoting the international recognition of Finnish company's in other countries. They have representative in Nigeria by name Mr. Olu Raheem who brings the business relationship between Finland and Nigeria into a reality.

Nokia and Wärtsilä are the active companies in the Nigerian market. Nigeria is among the top five African countries in trade partners of Finland, but the trade statistics is very low.2010 is the lowest year rate of importing and exporting between the countries. Finland exports a total amount of 47.7 million euro and imports a total amount of 47700 euro. The trade balance has been negative for Nigeria and positive for Finland for the past five years. (Finpro 2012)

Million Euro	2006	2007	2008	2009	2010
Finnish Exports	*98.7*	*104.3*	*67.6*	*61.5*	*47.8*
Finnish Imports	*0.2*	*0.3*	*0.2*	*0.1*	*0.1*
Trade Balance	*98.5*	*103.9*	*67.4*	*61.4*	*47.7*

Figure 6*: Trade between Nigeria and Finland in 2006–2010 Source: Finnish Custom*

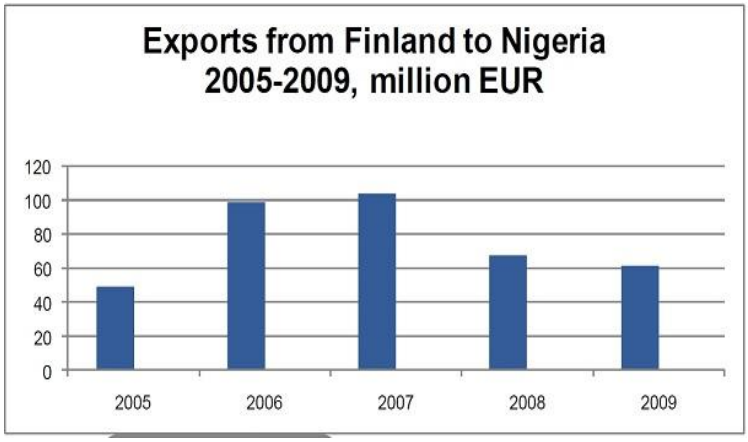


Figure 7: *Exports from Finland to Nigeria 2005–2009* Source: Finnish Customs via Finpro 2010.

On 26th-28th of June, a high-level Energy and Power delegate from Nigeria came to Finland to view the Finnish technology know-how in the transmission, power generation and distribution. Finnish companies such as Kemira, Poyry, Wartsila, Metso, Naps System and many more are involved in several meetings with the delegate to market potential in Nigeria. Finnish industries views Nigeria as a center of market attractions. (Embassy of Finland 2012)

Pictures 1: A high-level Power Delegation Visit Finland
Source: Embassy of Finland, Abuja

2.2 Economic factors

2.2.1 Economic stability

According to World Bank, Nigeria are second largest economy and stock exchange in Africa and the Godfather of West Africa economy. Nigerian economy is mainly focused on the petroleum sector which accounts for 85% percent of foreign exchange income and about 40% of its GDP. Nigeria is known as a middle-income nation with a developed, communication, transport s and financial sector. Economic reform in Nigeria is progressing which will deliver strong economy fundamentals. Prudent macroeconomics policies and strengthen financial institutions have been maintained by the government.

The economy structure is currently undertaking reforms with aided and effort by revenue from high oil prices which improves its weak inflation, string GDP growth and its macroeconomic outcomes. In the year 2009-2010, Nigeria real GDP increase from 7.0% to 8.1%.
The Rapid growth in 2010 after the global financial and economic meltdown underscored the resilience of the economy. There was also a bright medium-term prospect with GPD growth projected to be stable and strong with 6.9% in the year 2011 and 6.7% in the year 2012.

Nigerian economy is facing serious challenges despite its positive development due to its poor infrastructure facilities, Corruption, insecurity, electricity and high youth unemployment over the years. (African economic outlook Nigeria 2011)

The government has been tackling these challenges, for example, the Nigerian government is planning to privatize the power sector which will increase the economy boom.
Due to the high dependency of oil in the economy, the Nigerian government plans to focus on other sectors that will boost the economy towards the next decade like agriculture, and telecommunication.

The growths and developments of industries held a larger share in total GPD "in the Nigerian economy" Nigerian governments have set a target of being among the Top 20world economies. (Finpro 2010)

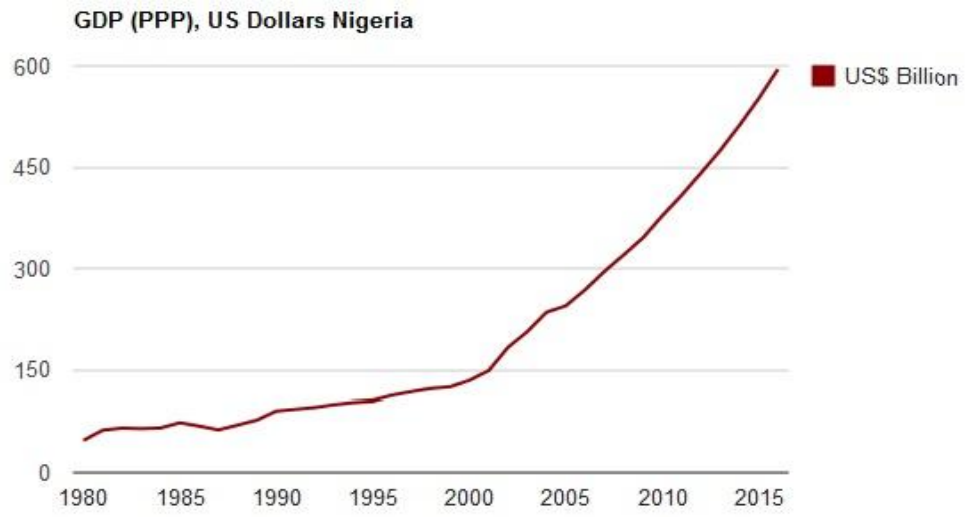


Figure 8: Nigeria Economic Statistics and Indicators
Nigeria Economic Statistics and Indicators
Source: Economy watch

2.2.2 GDP Value and Growth

The GDP calculate the input and output income of a country economy which is equal to the total expenditures being produced for the goods and services in a given country at a particular period of time. The Nigeria Gross Domestic Product (GDP) is worth 247.1 billion American Dollars in 2011 (CIA Fact Book 2012). Nigeria GDP value is estimated to 0.31% of the world economy. (World Bank Publication 2011)

According to National Bureaus of Statistic (NBS), report stated that Nigeria real Gross Domestic Product (GDP) in the first quarter 2012 grew by 6.17% is assisted by the non-oil sector. The decline in the first quarter of the year 2012 GDP in Nigeria is related to the decrease in the oil and non-oil sectors such as the whole and retail, manufacturing, and communication with a figure of 0.96 % compared with the real GDP rate of the first quarter of the year 2011 with 7.13%.

According to National Bureaus of Statistic (NBS) report covers the 2011 and the first quarter of Q1 2012 states that Q1 2012 is being affected by the reduction in the economic activities that was instigated by the fuel subsidy removal with its civil protest and low consumers request due to the high price of oil products.

Despite the reduction of Non-Oil consumption in the first quarter of 2012, it still continued to be the main driver of the economy with 7.93% growth in the first quarter of 2012.

(National Bureau of Statistic 2012)

The tables below illustrates the projection growth rates for real Gross domestic Product, value of total trade and inflation in reviews of the Nigerian Economy in 2011, and economic outlook for 2012 - 2015 which describe that in the year 2012 the real GDP of the Nigerian economy is projected to grow by 6.50 %, lower to the annual growth rate of the year 2011. However, in the year 2013, the Nigerian economy is projected to incline at a faster rate of 8.04 due to the repeal of the PMS subsidy which is expected to dissipate. It will also grow at a respectable rate of 7.43 in 2014 and 7.25 in 2015.

Year	2007	2008	2009	2010	2011	2012f	2013f	2014f	2015f
GDP	6.45	5.98	6.96	7.98	7.36	6.5	8.04	7.43	7.25
Trade	5.08	16.88	-3.00	57.49	47.87	-11.03	11.25	20.6	16.44
Inflation	5.57	11.98	11.97	13.59	10.91	13.57	12.21	12.04	11.91

Table 3: Projected Quarterly Growth Rates for the period 2012- 2015

	2012Q1f	2012Q2f	2012Q3f	2012Q4f	2013Q1f	2013Q2f	2013Q3f	2013Q4f
GDP (%)	5.34	6.37	6.85	7.07	9.08	8.12	7.72	7.55
Total Trade (%)	3.76	-12.33	-11.86	-20.24	-2.91	8.29	17.46	21.66
	2014Q1f	2014Q2f	2014Q3f	2014Q4f	2015Q1f	2015Q2f	2015Q3f	2015Q4f
GDP (%)	7.53	7.46	7.4	7.36	7.34	7.29	7.23	7.17
Total Trade (%)	23.67	21.15	19.29	19.02	18.95	16.57	15.01	15.64

Table 4: Projected Annual Growth rates for Real GDP, Inflation and value of total trade in Percentage
Source: (National Bureau of Statistic 2012)

According to Thomas Reuter's international news agency, it stated that, in second Quarter of year 2012, Nigeria GDP will rise by 40%.

This will enable Nigeria to be on the rank of the middle-income class countries which will also be close to South Africa, which is Africa most developed economy. (Reuter's webpage 2012)

According to the global chief economist of Renaissance Capital, Mr. Charles Robertson report which forecasted that Nigeria will be among fastest growing economies in the year 2012/2013. In 2011, Nigeria was the 6th fastest growing economies in the world, ahead of India.

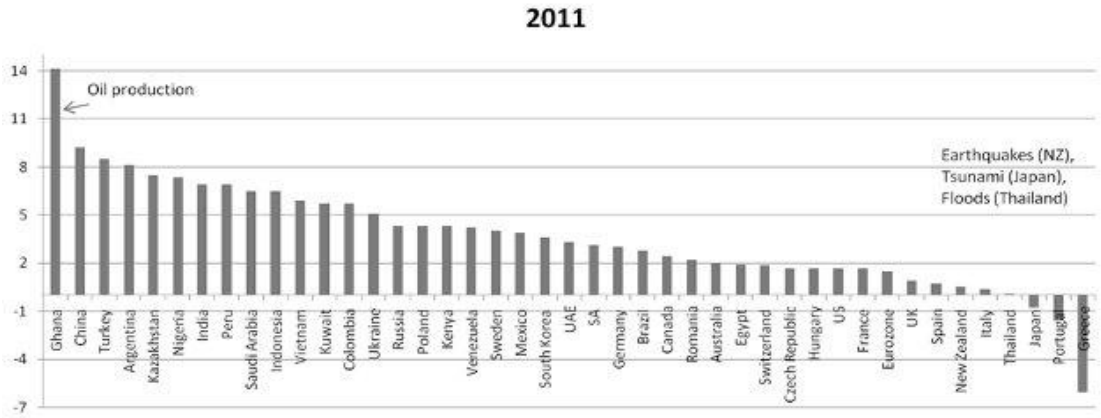
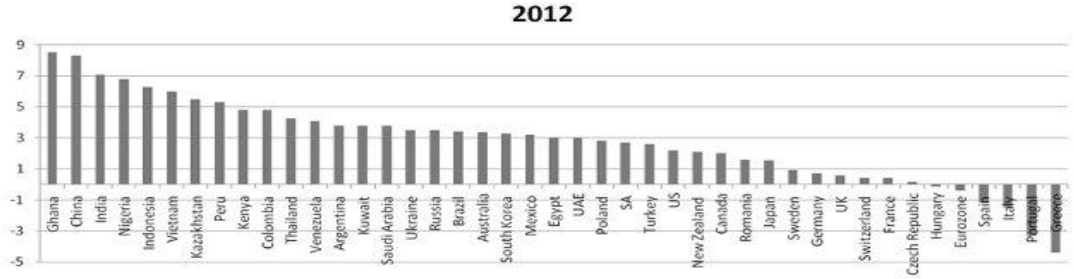


Figure 9: Fastest growing economies 2011–2013
Source:HowWeMadeItInAfrica

By the end of the year 2012, Nigeria will show its strong GDP growth with 4th position in the fastest growing economies behind Ghana.



Source:HowWeMadeItInAfrica

It maintain its GDP growth rank in the year 2013 and be the strongest and fastest growing economies in Africa ahead of Ghana. (Renaissance capital 2012)

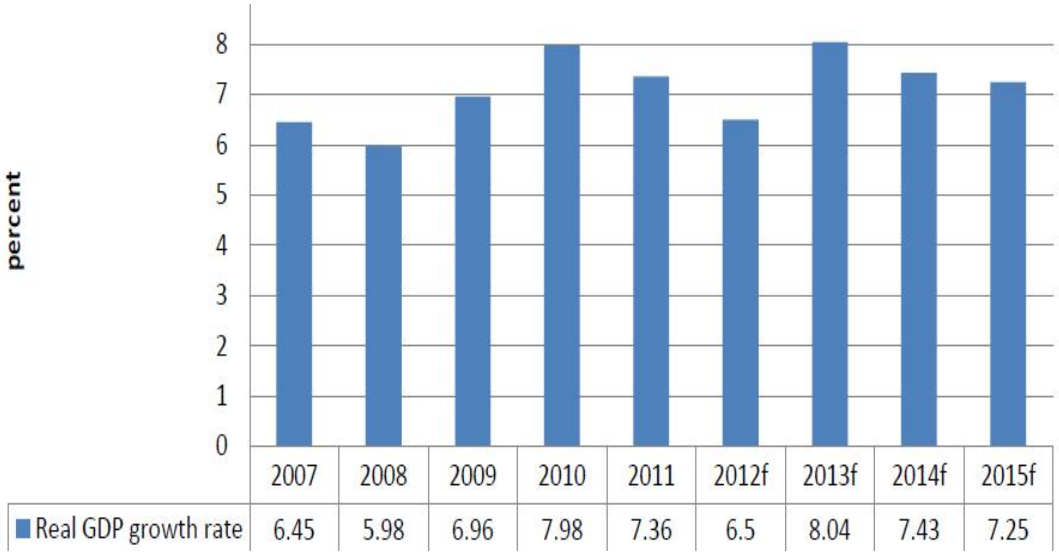


Figure 10: Projected growth rate of real GDP (2007-2015)

Source: National Bureau of Statistic

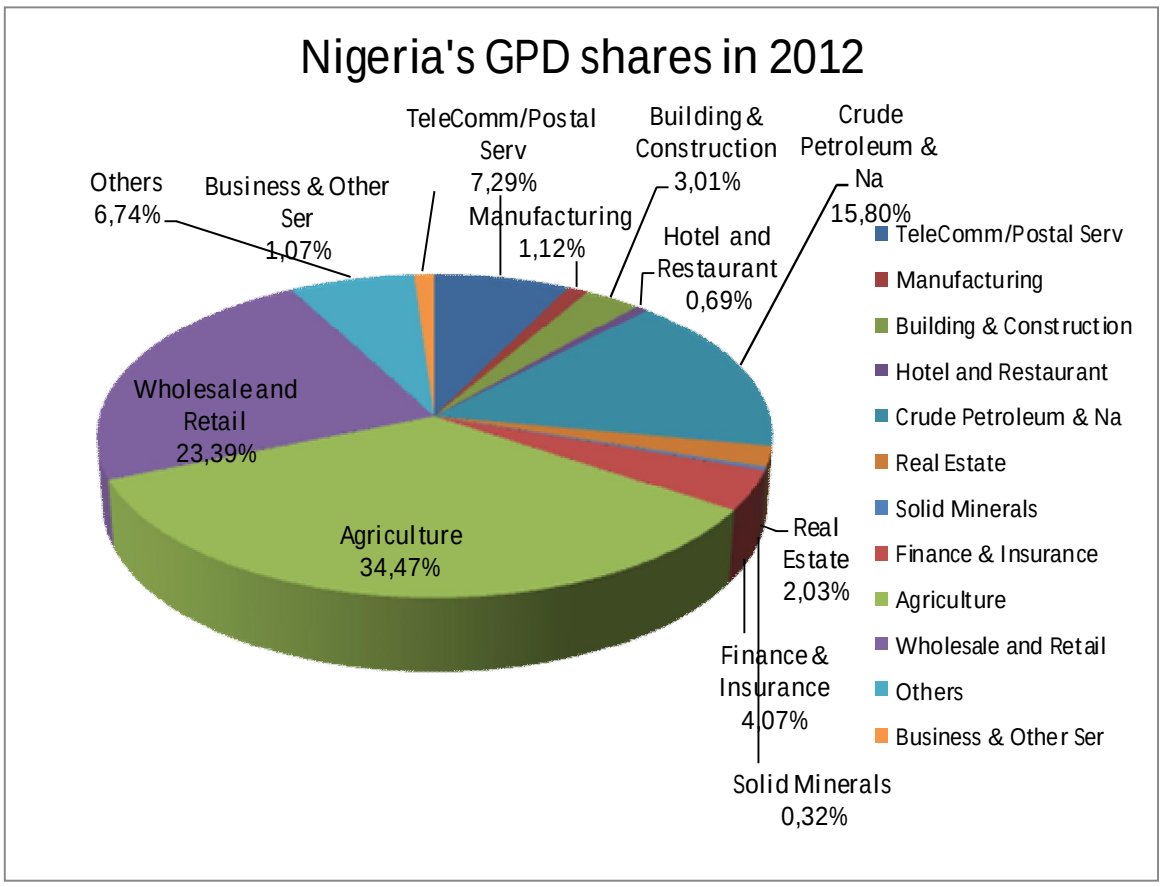


Figure 11: Nigeria GDP shares in Q1 2012.

Source: National Bureau of Statistics

2.2.3 Employment

According to National Bureaus of Statistics report, it stated that unemployment rate in Nigeria is accelerating vastly, increasing at 16% per year. The unemployment rate is highly impacted on the Youth of the nation with over 50%. 35%are employed while 9% are under employed. In the year 2011, the unemployment rate in Nigeria was reported to being about 24%; at which about 60% are employed.

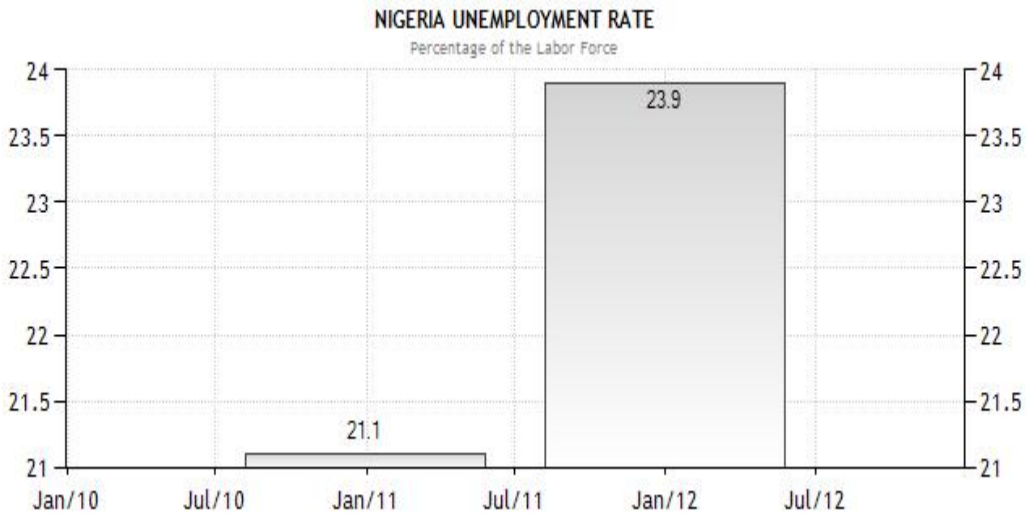


Figure 12: Nigeria Unemployment Rate
Source:Tradingeconomics/National Bureau of Statistics

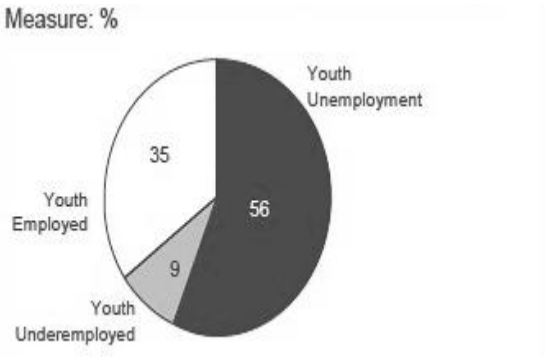


Figure 13: Youth Unemployment 3X General Unemployment
Source: Dore partners/National Bureau of Statistics

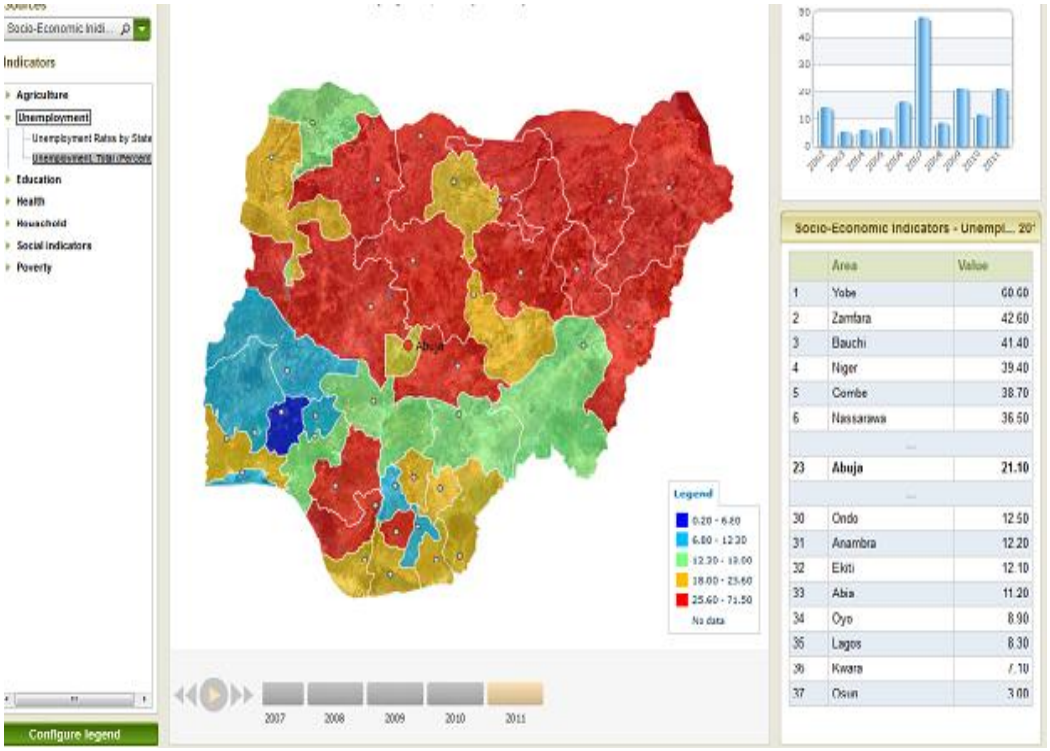


Figure 14: Socio-Economic Indicators – Unemployment in Nigeria State Total (Percentage) - 2011

Source: National Bureau of Statistics

According to the above diagram of the National Bureau of statistics reports, it's illustrate that unemployment is very high in the northern region, moderate in the middle belt of the nation, and fair in the southern part of the country.

In the north, unemployment's rate in the state of Yobe is 60 percent is the highest, and Nassarawa state with 36.60 percent is the lowest rate in the northern.

Abuja, the capital of Nigeria have 21 percent unemployment rate in states. In the Southern part of the country, the state of Osun has the lowest rate of unemployment in the country with 3 percent, Lagos with 8.30 percent, Abia state with 11.20 percent, Anambra state with 12.20 percent and Ondo state with 12.50 percent with the highest rate of unemployment in the southern part of Nigeria.

2.2.4 Inflation Rate

Inflation rates were known as Increase in Price measured to a standard level of power purchase. In April 2012, Inflation rate was reported to being at 12.90.for the past six years; Nigeria Inflation rate average is estimated to be 10.5%.its highest rate time is 15.6& in the year 2010, and lowest rate time was 3% in the year 2006. The GPD deflator measures the inflation of the whole nation domestic economy and the CPI which measures the consumer prices.

Figure 15: Nigeria Inflation Rate

Source: Trading economics/ Central Bank of Nigeria (CBN)

2.2.5 Current account structure

Current Account structure of Nigeria is referred to as the sum of the balance of trade plus the net factor income plus the net transfer of payment in a defined period of time. According to Central Banks of Nigeria, it reported that Nigeria current account surplus is estimated as 8140 Million USD in the Q2 2011. Nigeria recorded a low current account of 4410.0000 Million USD in the Q4 2010 and a high current of 9455.3700 Million USD in Q4 200

Figure 16: Nigeria Current account structure

Source: trading economics/Central Bank of Nigeria (CBN

Figure 17: Current Account balance USD

Country	2004	2005	2006	2007	2008	2009	2010
Nigeria	5,228,000,000	5,597,000,000	12,590,000,000	2,514,000,000	4,847,000,000	22,890,000,000	27,770,000,000

Country	2004	2005	2006	2007	2008	2009	2010	2011
Nigeria	5.2Billion	5.5Billion	12.5Billion	2.5Billion	4.8 B	22.8	27.7B	12 B

						B		

Table 5: Current Account balance USD (2010)
Source: Index Mundi/ CIA World Fact Book 2011

Above graphs above illustrate that the capital current account of Nigeria has been improving from 2004 to 2006 from 5 billion to 12 billion USD. In the year 2007, it declined to 2.5Billion and rose up speedily in the year 2008 to 2010 from 4Billion to 27Billion USD.

According to CIA (2012) it stated that the Capital current account balance for Nigeria for 2011 is $12.01 billion (2011 EST.)

2.2.6 Labor Force

Labor force refers to all the employed persons of a particular organization or country who are working or have a business. (Oxford University Press 2012)

According to the meaning by the statistics Canada, it stated that employed individuals are the ones that have a business or job. The unemployed individuals are the ones without a job or business, which postulate that labor force, constitute both the employed and the unemployed.

In reference to the National Bureau of Statistic report which stated "in computing the unemployment rate with the total population is divided into the labor force (currently active) and non-labor force (not currently active)." "A person is employed if he or she is involved in the good and services production by contributing to GDP in a legitimate approach which is n element of the national accounts.

The category of people considered, not in labor-force is those that are not working who are not finding a job or are not ready for work as those above or below the working age in the African continent.

Unemployment rates have risen up with Africa largest economy (South Africa) which rate is higher than Nigeria at 25 percent, Botswana at 17.5 percent, Namibia at 51 percent, Egypt at 11.8 percent, Angola at 25 percent and Kenya at 11.7 percent reported National Bureaus of Statistic. Labor force covers individuals at age 15-64. Nigerian labor force population is estimated to be 52.16 million (2011) Est. Agricultural sectors employed 70% of the labor force; Service Sector employed 20% of the labor force (1999) EST. The Industry sector employed 10% of the labor force. (CIA Fact Book 212)

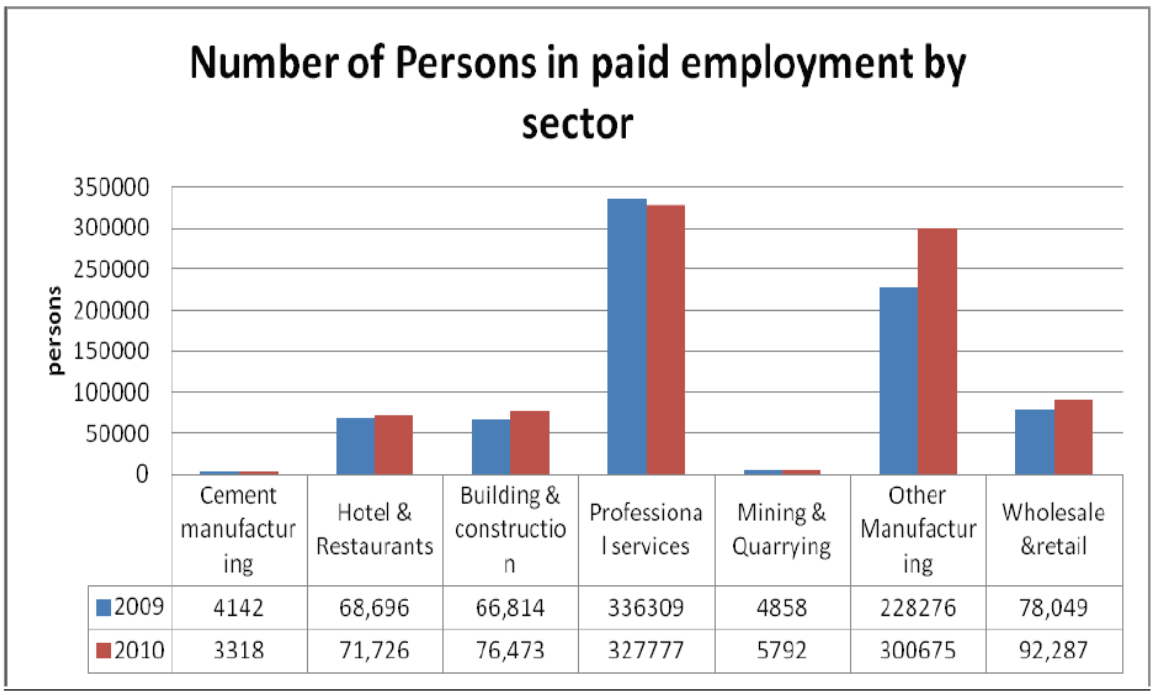


Figure 18: National Bureau of Statistic Survey Report 2011

Source: National Bureau of Statistic Survey Report 2011

2.2.7 Exchange rate

Exchange rates were the market current price by which a currency can be exchange for one another. For examples, If Euro exchange rates for Nigeria Naira stand for 200,it means that 1 Euro can be exchange for 200 Nigeria Naira. Exchange rate plays an important role in a country's competitive range. Currency exchange is among the most forecasted and analyzed indicators in the whole world. The demand and supply in the international markets is determined for the exchange rate level. (Trading Economics 2012)

The issue of a currency note in Nigeria was responsible for the West African Currency Board from 1912 to 1959. Before the introduction of the West African Currency Board, Nigeria used cowries and manilas as a form of money transaction. Nigerian currency notes and coins first issued in 1959 by the Central Banks of Nigeria. In 1962, it legal tender status was changed to reflect Nigerian new currency status.

The Nigerian currency unit was called Naira (₦) which was equivalent to ten shillings, and the minor unit was called Kobo; 100 Kobo is equivalent to One naira. In the year 2007, N50, N20, N10, and N5 notes with N1, 50Kobo and N2 coins were redesign and reissued which was part of the economic reform by the Nigerian government. (Central bank of Nigeria 2006-2011)

Nigeria Naira Exchange rate has been unstable for a while, especially in the exchange rate between Nigeria Naira and the European € euro, American $ Dollar and Great Britain £ Pound sterling on a daily, weekly and monthly basis.

Figure 19: Exchange rate between NGN and EUR from 20 May to 18th June 2012
Source: Exchange rate.org

2.2.8 Division of income

Income distribution is define as the national income GDP which is divided among groups of household, social class, factors of production or individuals used to compute an average comparison purposes. (Business dictionary 2012)

The Gap between the rich and the poor in Nigeria is very wide, and national income of distribution had attracted political passion when the states or communities, relative shares of the region; were affected. Until oil exploration in the country no longer exist before the economy mobility gap between class and individuals likely to become a high issue for the poor citizens of the Africa oil giant. (Council on Foreign Relations 2012)

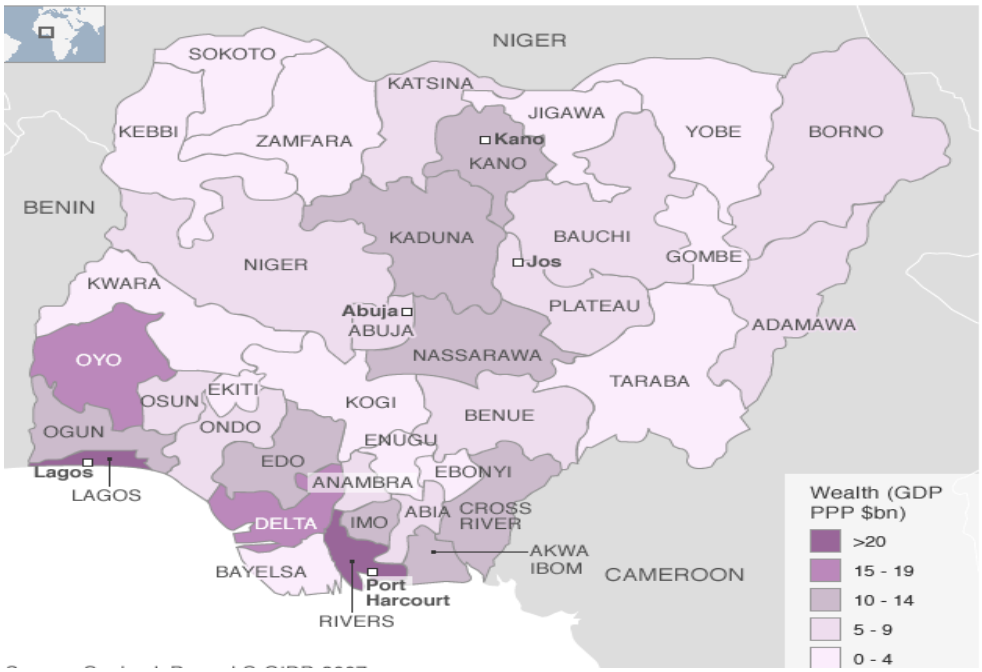


Figure 20: Wealth (GDP&PPP) in Nigeria States
Source: BBC 2012/ Canback Dangel "C-GIDD 2007

The diagram above wealth growth in the states, Lagos, Rivers and Delta state has the high GDP ratio in the southern region while Kano and Kaduna has the high GPD ratio in the northern region. According to the united nation, Nigeria is ranked among the unequal countries in the World, and the rate of poverty is the north is very high to developing southern states. While in the South-east and south –south such as Rivers state, Delta state and Akwa-Ibom state which is oil rich region still suffers from the wealth Pipeline exploration from Abuja to Lagos. (BBC 2012)

2.3 Socio cultural factors

2.3.1 Population demographics

Nigeria current population is estimated to be 170,123,740 (July 2012) with a population growth at the rate of 2.553 percent per Annum.

The age structures are 0-14years which contain 40.9 percent with (male 32.476.681 and female 31.064.539), 15-64years which contains 55.9 percent with (male 44.296.228 and female 42.534.542) 65years upward which contains 3.1 percent with (male 2.341.228 and female 2.502.355) of the total population. Birth rate is 39.23 births per 1000 population and death rate is 13.48 deaths per 1000 population 2011 estimate.

Nigeria is a religion country which is dominated by Islam with 50 percent, Christianity with 40 percent and Traditional or Indigenous belief with 10 percent of the population. Its official Language is English and more than 500 indigenous languages such as Yoruba, Igbo Hausa etc. Nigeria has more than 250 ethnics groups; few of the most political and popular influential are the following: Hausa-Fulani with 29 percent, Yoruba with 21 percent, Igbo with 18 percent, Ijaw with 10 percent, Kanuri with 4 percent, Ibibio with 3.5 percent, Tiv with 2.5 percent(%) etc. (BBC/Ulrich Lamm 2012)

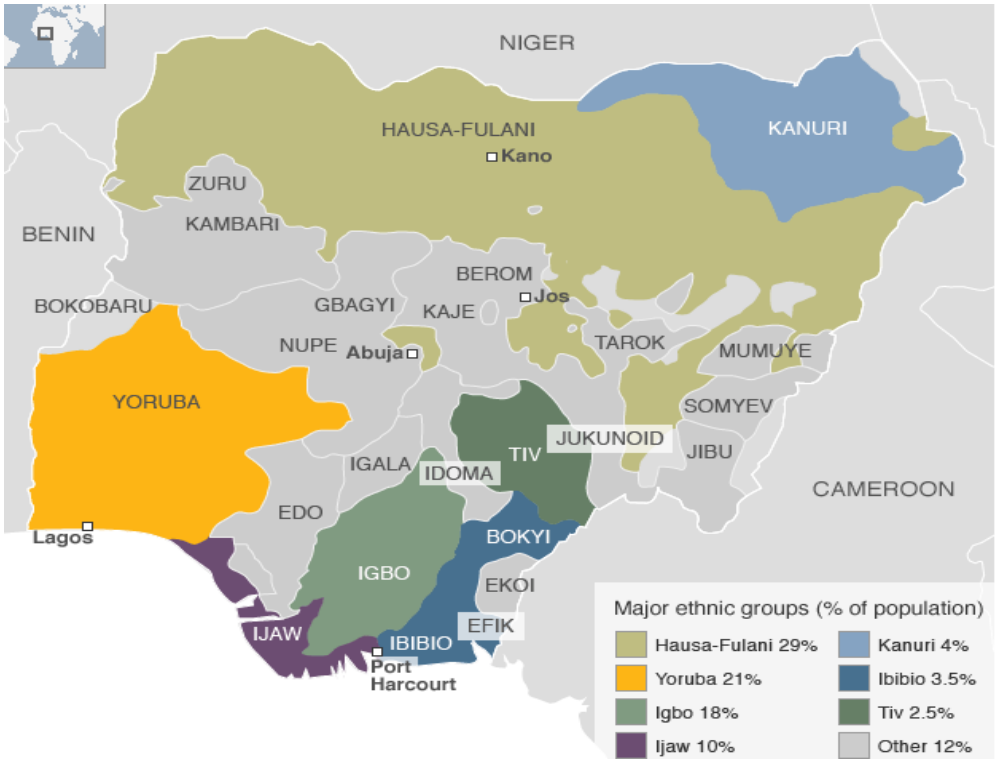


Figure 21: Nigeria major ethnics groups (% of population)
Source BBC 2012/Ulrich Lamm

The diagrams above describe the percentage of the total population of the 170 million Nigeria ethics groups.

The Hausa-Fulani people with 29 percent of the total population are based in the northern region of the country; with most of them all being Muslim. (BBC/Ulrich Lamm 2012)

The Yoruba with 21 percent of the country total population is situated in the south-west; which are divided between 60 percent Christian and 35 percent Muslim while the Igbo with 18percent of the total population are based in the South-east and are mostly 99 percent Christian. The middle region has many ethics groups with different beliefs. The Ijaws are with 10percent of the total population with mostly Christians and many other small groups with tiny percentage of the total population such as the Kanuri, Ibibio, Tiv etc.
(BBC/Ulrich Lamm 2012)

2.3.2 Geographical Division and Growth Centers

Nigeria is located in the Western region part of Africa, bordered with the gulf of guinea between Cameroun, and the republic of Benin. It geographic coordinate is calculated to be 10 00 North, 8 00 East. Total area size is 923,768 Sq. km, Land Area is 910,768 Sq. km and water area is 13,000 Sq. km thereby making its area comparative to be slightly more than double size of California.

Total land boundaries is estimated to be 4,047 km which border with Benin by 773 km, Cameroun by 1690 km, Niger 1497 km and Chad by 87 km. Coast line is equivalent to be 853 km. Maritime Claim. The southern part of Nigeria like Lagos, Port Harcourt and Abia has increased in growth and development. Abuja is drastically developing for the past 10 years follows by Kaduna and Kano state in the northern region of the country.

2.3.3 Society structure and social Group

Nigeria social structures are described as the number of individuals that are separated into different element such as the traditional and political leaders. Nuclear, compound and extended family are the three main family systems that are being practice in the Nigerian society .Nuclear family consists of Father, mother and their children living under the same apartment; the compound family consist of father/stepfathers, mother/stepmother, children, brother, uncle and Aunty in the same or closer compound; and the extended family consist of father, mother, children, grandchildren, uncle, aunties, brothers, nephew, niece and grandparents in the same environment. Nigerian cultures and its people have a common distant bond among them. The environmental circumstances, political, social and the economy development exposure have open Nigeria structural systems into a new world. Common trait as the growing communication and fashion among the people is also part of the social attributes in the country (O. Otitie 2011)

Social group in Nigeria is classified into a different element such as the ethnics groups, religions group and many more. Islam is the majority of the Nigerian religion with 50 percent, followed by the Christians with 40% and traditional, indigenous belief with 10 percent.

2.3.4 General Culture in Nigeria

2.3.4.1 Gestures

Nigerians reckon with one another in the society by making a hissing or kissing sound and making sucking the lips. A sign of thumbs up with an upward motion or action is known to be an obscene gesture and rude by the people. You cannot give a person something with a left hand because it shows a sign of rudeness to the other person. (Culture Crossing 2011)

2.3.4.2 Communication Style

Nigerians are very straightforward and direct in communicating and it often takes time in getting to a conclusion in some circumstances. You will have to be patience in handling things, and do not let people feeling that you are in a hurry. Losing your temper in some certain situations will not bring a solution. Large emotions are known and acceptable in a public situation. In often times, when people were making some conversation, it appears as a sign of the argument. (Culture Crossing 2011)

2.3.4.3 Time Views

The Nigerian time is always discus among Nigerians, which portray that things appointment are often made, interruptions are frequent, things rarely start on time, and you must be patience for things to happen. It is always common for meeting or an event to start late due to erratic transportation or an emergency delay which is usually tolerable in the system. In some situations, coming late to a meeting shows how important the person is or maybe the person is of a high ranked status i.e. point of being punctual is always shown by senior businessmen and officials. (Culture Crossing 2011)

2.3.4.4 Law and Order

Eighteen is the legal age for buying alcohol in Nigeria but its seldom abide. There are strong penalties for those that are caught with illegal drugs. Homosexual is illegal and not allowed in the society. (Culture Crossing 2011)

2.3.4.5 Personal Space and Touching

The concept of personal space is very low in the Nigeria society. In most cases, less than an arm's length is allowed. In the Muslim area of the northern part of Nigeria, the men and women always keep a more distance between them. Touching is always a sign of reinforcement status, such as an adult person placing a hand on the young's person shoulder. (Culture Crossing 2011)

2.3.4.6 Gender issues

In Nigeria, there are women in high ranking position, and women can work. Mostly, women are expected to get married, remain faithful to their husband and have children. It is an unacceptable act for men to be unfaithful. The adult women must be devoted to their family in the Muslim part of the country. Depending on the situation, foreign woman is often treated as honorary men. (Culture Crossing 2011)

2.3.5 Business Culture in Nigeria

2.3.5.1 Dressing Style

Nigerians are found of dressing well and always come to a business meeting in their formal local clothing or in a suit. Both their men and women like the western clothing style. (Culture Crossing 2011)

2.3.5.2 Titles and Business Cards

In Nigeria, you are called by your first name followed by surname name (Family name).
You can call person first name using Mr., Mrs., or Miss.
Titles are an important entity in the country, for examples, Engineer (Engr.), Doctor (Dr), Lawyer or Bishop is used as titles. It is advisable to wait to be invited before calling someone by their first name. In handling business cards; it must be presented and accepted with your right hand. It's also a good idea to smile and make eye contact during the process. (Culture Crossing 2011)

2.3.5.3 Meetings

In every meeting, it is advisable to turn up on time before it commence, but be prepared for other meeting attendee's to be late. You greet the meeting attendee's in order of their seniority level. This can be observed by a person who has the biggest chair, who people are deferring to etc. Making long and nice greetings with a decent interaction are polite and common in the nation business culture.

Asking about person family and health is a good way of starting an interaction. Note that the purpose of organizing a meeting is for the sake of knowing one another because sometimes business may not be fully discussed in first meetings and patience is very important in the doing business in Nigeria. (Culture Crossing 2011)

2.3.5.4 Negotiations

A top down approach for decision making is very important in handling negotiations in the country. Apart from business, bargaining is a vital part of most purchases. Be of little emotion during any form of negotiations; and beware of losing control, because it is unacceptable in the country business culture. (Culture Crossing 2011)

Cultural dimension

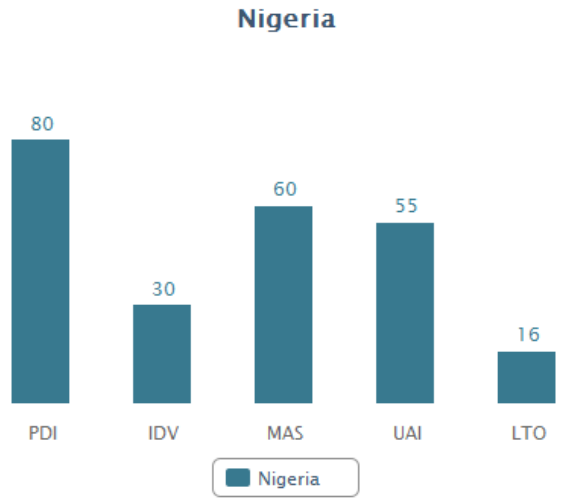


Figure 22: Nigeria Cultural Dimension

According to the Holfstede, The culture of Nigeria is measured in five dimensions: which will be describing as follow.

2.3.5.5 Power Distance Index (PDI)

Nigerian has a higher Power distant index with a scale of 80. Most of the individuals in the country are not equal which shows the cultural attitude towards inequalities in the society. Hierarchical order is mostly accepted in the country where citizens have a place with no further justification. (Geert Hofstadter 2012)

2.3.5.6 Individualism (IDV)

Nigeria has a low score of 30 which can be considered as a collectivist society. It is an interdependent society where People always belong to in-group that can take care of them for the sake of unquestionable loyalty i.e. the society and close family integrate into a strong bond. (Geert Hofstadter 2012)

2.3.5.7 Masculinity / Femininity (MAS)

Nigeria is a country at which the Men dominate the society environment which shows that the nation society is driven by achievement, success, competition being defines by the best expertise in every field. Feminine society is very low whereby the masculine are the main individual who takes care of the responsibility of their society and quality of life.
(Geert Hofstadter 2012)

2.3.5.8 Uncertainty avoidance (UAI)

Nigeria accept uncertainty, due to their code of conducts, belief and behavior and their ideas unorthodox behavior are intolerant. People are focused at what they do i.e. hard work, focus, and punctuality in business etc. (Geert Hofstadter 2012)

2.3.5.9 Long term orientation (LTO)

The long term orientation system in Nigeria is very low. They all have great respect for their tradition and culture, strong social force to “Maintain with the Jones” a relatively a propensity to save, a strong concern with establishing the truth and impatience for achieving quick results. (Geert Hofstadter 2012)

2.3.6 Human rights

Human rights can be simply defined as the right that is a guarantee to every human being, no matter the place of residence, national or ethical origin, sex, language, religion, color, nationality, or any status. (United Nation Human Right 2012)

Nigeria automatically accepts all the rules and regulations issues that are related to United Nations Human rights when it joined the united nation in the year 1970.
Every citizen and Non-citizen of Nigeria is entitling to human rights without any discrimination; because the rights are all indivisible, interrelated and interdependent by the Nigerian government and the international human right law.

Nigeria breaks some rules and regulations of human rights laws in different areas of the nation such as the abduction of militant groups in the Niger delta region; abduction of Suicide Bombers in the northern region of the country; bonded labor; child labor; political motivation and judicial killings by the state security forces; gender identity; torture; discrimination based sexual orientation; rape; discrimination against a person with disabilities; inhuman and degrading treatment of criminals suspects, detainees, and prisoners; forced labor; arbitrary arrest and detention; human trafficking for prostitution purpose; denial of public trial, vigilante killings, infringement on citizen privacy rights; discrimination and violence against women; restrictions of freedom of speech, movement, religion, assembly, press; Kidnapping etc. nevertheless that the rules and regulations that are being violated in the country.
The Nigerian government had been making the human rights issues a priority by energizing the human right commission in the country for adequate performance. For examples, the National Human Rights Commission was created to handle and contribute for the protection of human rights issues in the country by implementing the national and international human right rules and regulations. Other NGO that deal with Human rights in the country is working effectively to support and energies the right of citizens and non-citizens.

In the year 2011, President Good luck Jonathan signed the Freedom of Information Act in the Nigeria Law as approved by the national assembly. This new law has given Nigerians the motivations and eagerness to uncover to fight corruption, uncover facts, and hold any corrupt government and non-government officials accountable. (Nnamuchi 2007)

2.3.7 Public Heath

Nigeria acknowledge the right to health system and commit itself to its protection by assuming the rules under the national and the international legislature that recognized conducts with respect to individual health. The level of communicable disease in Nigeria is not encour-

aging. The health sector is not improving. Doctors prefer to go abroad to work for Greenwich pastures due to the low level of payment in the health sector.

There is no improvement in the total fertility rate, maternity ratio and the infant mortality rate. In Africa standard, Nigeria is one of the most populous African countries that have the worst health indicators. Nigerian governments have failed to combine the large pool of health resources such as (Finances and personnel) into an appropriate combination to improve the health outcomes and health indices. Life expectancy birth rates have dwindled for the past 20 years from 47 years in 1990 to 52.05 years in the year 2011 EST.

Maternal mortality rates are high at 840 and under age five mortality rates were high at 157 which are more than twice of South Africa with 410 which is our continental rival, and Ghana with 350 which is our regional rival. (Tukur Dahiru 2011).

Nigerian health expenditure is 5.8 percent of the country GDP. Degree risk of diseases is high and major infectious diseases are listed as follows. Food or waterborne diseases such as protozoa and bacterial, hepatitis A and E, and typhoid fever; vector borne disease are yellow fever and malaria; water contact diseases are sadomasochists and leptospirosis, and respiratory disease is meningococcal meningitis. (CIA Fact 2009 estimates)

According to vanguard reports in May 18th 2010, new minister of health Prof Onyebuchi Christian Chukwu has promoted that all Nigerians should start to enjoy standard health indices and outcomes unity and cooperation's among staff of ministry of health and entrenchment the tenets of team work.

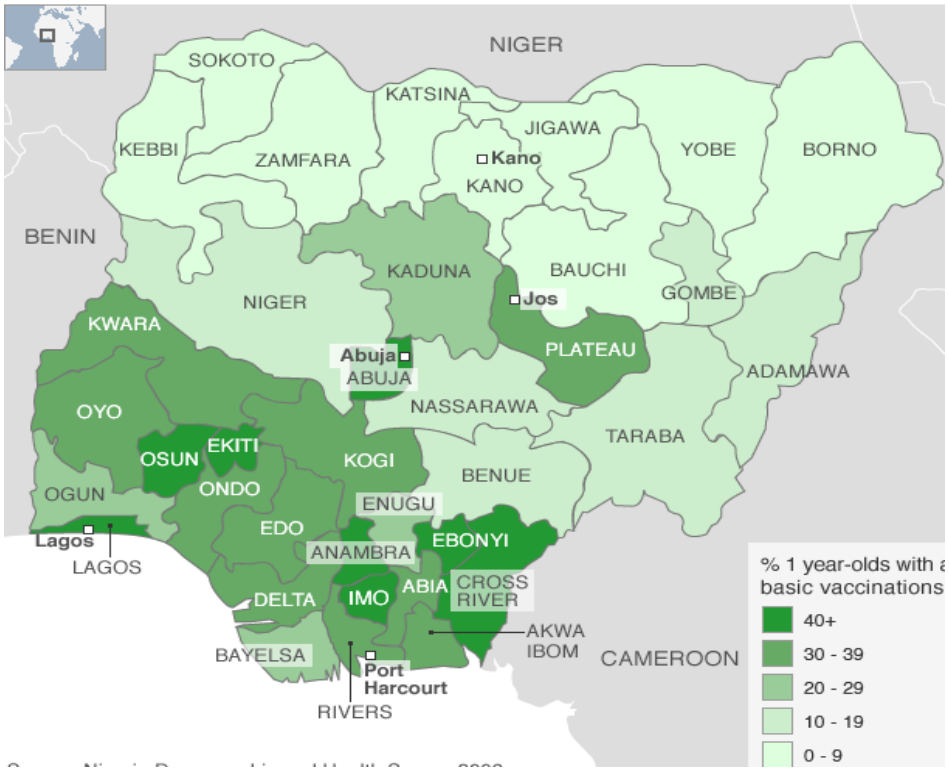


Figure 23: Percentage of One year old with all Basic Vaccinations
Source: NDHS 2008/ BBC 2012

The above diagram illustrates the percentage of 1year-olds children with all basic vaccinations in Nigeria. Southern resident shows to have better access to healthcare as describe by the great usage of vaccines for tuberculosis, Polio, diphtheria and tetanus.
The northern residents have slow access to healthcare due to the past rejection of immunization programmes, saying that the west plan to infertile the Muslim women with the uptake of those vaccines.(BBC-NEWS 2012)

2.3.8 Level of Literacy

Literacy, according to the state and federal ministers (MCEETYA 2007) is one's ability to read and "utilize written information and utilize it appropriately in a range of context" It involves the "integration of listening, viewing and critical thinking with reading and writing, listening, speaking and cultural knowledge to empowers, readers, writers and speakers to recognize appropriate language for different situations. However, Pam Allyn (2012) defines Literacy as reading, writing, listening and speaking. She refers to as a"LitLoop".
(The Huffington Post 2012)

According to the united nation educational, scientific cultural and organization (UNESCO) reports on literacy, stated that Nigeria is progressing towards education for her citizen. Illiteracy still remains a major setback with 8.6 million Nigerians primary school pupils are out of school. Furthermore with 50 million adults who cannot read or write.

In the month of May 2011, Nigerian government received a major development with the signing of agreement with the united nation educational, scientific cultural and organization (UNESCO) in Paris France worth 6 million USD to revives adult and youth literacy in the country (UNESCOPRESS 2011).

In year 2003, Nigerian literacy rate was 68%, which consist of 75.7 percent males, and 60.6 percent females. (CIA 2012)

The current level of literacy in Nigeria IS 67.1 (Nigeria Statistical Data 2008)

The Map and figure below shows the level of adult literacy in Nigeria and its state. Investing in renewable energy business in Nigeria is a plus for the investors due to high level of literacy in the country among the youth, and this will gives the unemployed the opportunity to work with international company in the country.

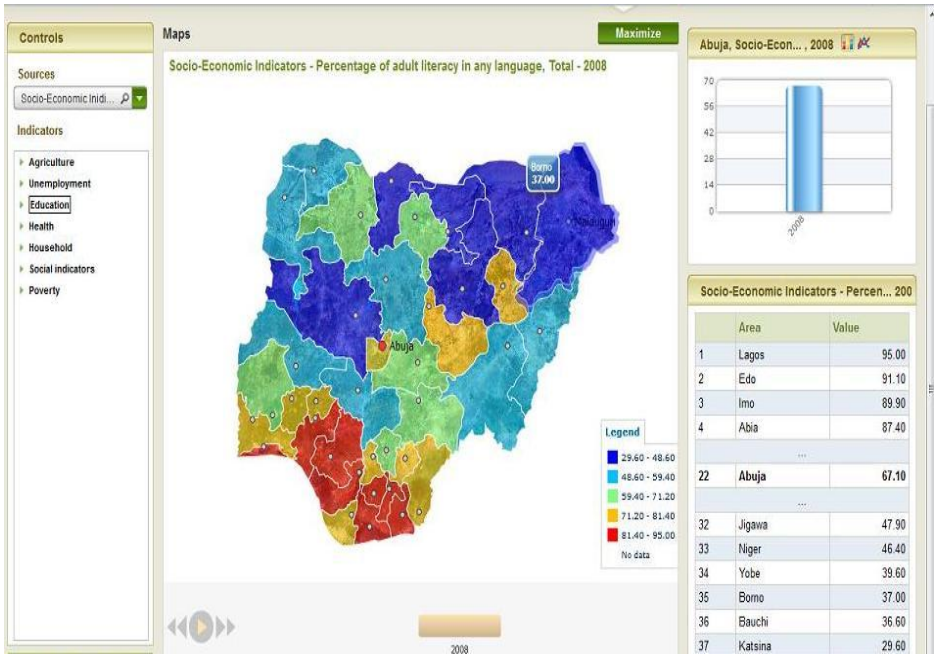


Figure 24: Socio-Economic Indicators - Percentage of adult literacy in Nigeria and its state Total - 2008

Source: Nigeria Statistical Data 2008

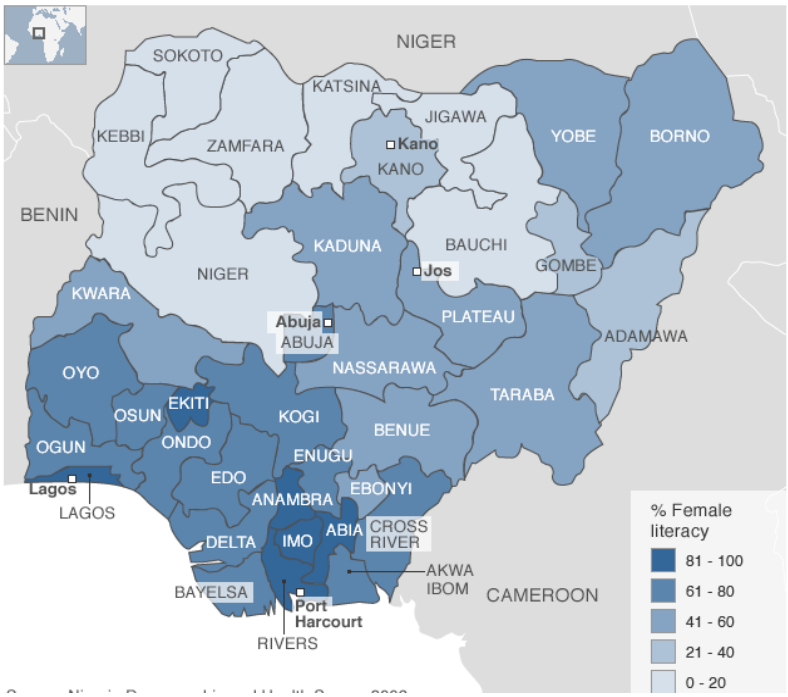


Figure 25: Percentage of Female Literacy
Source: BBC 2012/Nigeria Demographic and Health Survey 2008

The above Diagram shows the number of female literacy in Nigeria. In the south west region; more than 80 percent of the female are literate, in the south east region; more than 90 percent are literate and less than 5 percent women are educated in the northern region. In the next generation, female literacy is projected to be the solutions in raising the Nigerian living standard for examples if a mother is well educated, it is likely their new born baby survives. (BBC 2012)

2.4 Technological Factors

2.4.1 Level of technology in renewable energy

Renewable energy technology refers to technologies which produce clean energy and sustainable sources such as plant, wind, sun and water (Renewable Energy Technologies 2011). Nigeria renewable energy policies and master plan exist in the national energy policy for a long time with the assistance of the UNDP in 2005. Some of the renewable energy technologies that are used in Nigeria are the Solar PV, Solar thermal, Wind, Small Hydro, and Biomass (Yusuf A.O 2012).

These Renewable energy Technologies can a breakdown into smaller products such as solar dryers, charge controllers, lamps, Bio-digesters, inverters, batteries, solar cookers, solar touch, and solar cookers. (Renewable Electricity Policy Guidelines 2006)

The introduction of Renewable energy technologies in Nigeria will strengthen the energy security, contribute to a strong energy economy and improve environmental quality.

2.4.2 Availability and cost of skilled employees

Skilled Labor refers to as a specialized workforce with a high and expertise level that is characterized by abstracts thinking, experience and high education background.
(Investopedia 2012)

According to the International Labor Organization report, it stated that Nigeria institutions produced about 700,000 graduates annually, with few of them getting employed for a short time. You can even see Doctors, engineers, lawyers or scientist working in a banking sector due to employment in their specialized field. Nigeria has many institutions, such as there were 53 Universities, 55 Polytechnics and 54 Colleges of Education in 2003. The number increased in 2007 to 58 Polytechnics, 56 Colleges of Education, and 93 Universities
(AKINYEMI SAMUEL PhD and OFEM, IGOT BASSEY PhD/ILO 2009)

The number of student enrollment in the institutions is at a higher rate. However, the total number of a student enrollment in a university increase from escalated from 606,104 in 2002-2003 academic years to 724,856 in the 2004-in 2005 academic year. Unemployment rate increased from 11.9 percent in year 2005 to 14.9 percent in 2008 to 24percent in the year 2011 (National Bureau of Statistics, 2011)

In Nigeria, the minimum salary or wage is 19,800 Nigeria Naira which is about 100 Euros monthly, which is very low and other sectors have their own salary wages based on their qualifications and experience. Starting a renewable energy market in Nigeria will be encouraging due to the salary payment scheme in the country.

2.5 Environmental factors

2.5.1 Geography

Nigeria is located in West Africa, bordered with the gulf of guinea between Cameroun and the republic of Benin.

It geographic coordinate is calculated to be 10 00 North, 8 00 East. Total area size is 923,768 Sq. km, Land Area is 910,768 Sq. km and water area is 13,000 Sq. km thereby making its area comparative to be slightly more than double size of California.

Total land boundaries is estimated to be 4,047 km which border with Benin by 773 km, Cameroun by 1690 km, Niger 1497 km and Chad by 87 km. Coast line is equivalent to be 853 km. Maritime Claim. It climate varies by Arid in North, tropical in the center hemisphere and equatorial in the South. Its natural resources consist of Tin, Limestone, Arable Land, Petroleum, Iron ore, and Natural gas, Zinc, Gold, Bitumen, Niobium and many more. (CIA FACT 2012)

2.5.2 Climate and seasonal changes in temperature

Nigeria is a nation in West Africa, which is located within the tropical zone with fully humid climate enjoyment dominated by the West Africa monsoon system. However, ; Nigeria experiences two seasonal periods: a Dry season from November through March and a wet season from April through October. In the dry season, the northern region get dry due to the easterly wind from the Sahara called (Harmattan) which bring fair and dusty atmosphere, whereas the wet or the rainy season, the southern region moisture-laden from the Atlantic which brings rainy and cloudy atmosphere. However, there are wide ranges in climate in a different region of the country, with different topographical relief, which is the major factor.

The average temperature through Nigeria is always over 20Degree Celsius. Generally, the temperatures are higher in the drying season than the rainy season and also vary from inland to coastal areas.

The wettest area is located in the east coast, which receives above 4000mm rainfall annual, and the month of June is the wettest in the south. In the western part of Nigeria, its regions coast receives about 1800mm rainfall annually.

In the northern and central coast of Nigeria, annual rainfall decreases to about 500-1000mm. (UNDP 2010)

2.5.3 Natural resources

Natural resources refer to as resources that have not been disturbed by mankind in the environments such as Air, atmosphere and Wind, Wildlife, Water, Rivers, Agronomy, Coal, Fossil fuel, Crude Oil, Soils, Animals, plants, Gold, Diamond and many more. Natural resources can either be use or re-use. (Buzzle 2012)

Nigeria is a country with the abundance of natural resources such as of Tin, Limestone, Crude oil, Arable Land, Petroleum, Iron ore, and Natural gas, Zinc, Gold, Bitumen, Niobium, and other important commercial resources (CIA-Nigeria 2012)

For the market entry of Finnish renewable energy in the country, Nigeria is full of a variety of renewable and non-renewable energy resources. Renewable energy resources are Biomass, Wind, Hydro, Solar, etc. and Non-renewable energy resources are natural gas, fossil fuels, oil, coal, tar sands, etc. (A. S. Sambo 2008)

2.5.4 Frequency of environmental catastrophes

An environmental catastrophe is a disaster that occurred to the natural environment as a result of human involvement. Environmental catastrophes always have various effects on biodiversity, agriculture, human health and the economy. The causes include depletion of natural resources, pollution, agriculture or industrial activities. (Wikipedia 2012)

Environmental catastrophe is also an event, progressive or sudden, human or natural made, which contribute with such severity that the affected individuals or community has to reply by taking exceptional measures.

Nigeria lies between 4 North's poles and 14 North's poles of the equator. Nigeria experience variety of Catastrophes.

Catastrophe such as Landslide, Floods, Coastal erosions, Tidal waves, dust-storms, sand-storms, oil spillage, drought, insect/locust infestations and other human error Catastrophes, which have destroyed human lives in the country and rendered some homeless. In general, Nigeria has a weak economy with an under protected environment, which makes its environment to be vulnerable.

Increase in Nigeria populations in the last three decades has placed people at danger anytime an extreme weather event happen. The risk of flooding has risen due to the increase of human settlement on floodplains in the country which will cost the natural disasters to keep increasing.

Flooding is the most common natural hazards in Nigeria, causing property damage and claiming more lives than any other natural phenomena. Risk from one form of flooding to another cause 20 percent of Nigeria population to be at risk, especially in develop urban area such as Lagos state, Niger states, Benue state and other coastal region of the country.

Property worth's millions are dollars is damaged by heavy rainstorm and flooding each year with an average of 100 people killed. (KAYODE FAGBEMI 2002)

Due to the new National Emergency Management Agency (NEMA) that was introduced by the Nigeria government in 1999, to coordinates its catastrophes response activities with their new mandates which are listed as follows.

Monitored and Promote research activities related to manage disasters at the national level;
Introduce policy on all activities that are related to disaster management in the country and co-ordinate the programmes and plans for effective and efficient response to disaster at national level;

Educate and inform the public catastrophe controls and prevention measures;
Gather data from important and relevant agencies to enhance planning, field operation of disaster management and forecasting;
Facilitate and co-ordinate the provision of necessary resources for rescue and search and other disaster curtails. (KAYODE FAGBEMI 2002)

With the objective of the project, the natural disaster will have a low impact in the market entry of renewable energy in Nigeria since the natural hazards will only have a low impact on the renewable and non-renewable energy resources available such as Biomass, Wind, Hydro, Solar, natural gas, fossil fuels, oil, coal, tar sands, etc.

2.5.5 The level of Infrastructure

According to the Investor word webpage, it stated “Infrastructures are the physical system of a nation population, such as water, roads, sewage, utilities etc.”(Investor word 2012)

In reference to the Central Bank of Nigeria (CBN), it stated that infrastructure plays a hard role in the growths and development of Nigeria economy.

Available infrastructures will encourage interest and investment in less developed area, which will allow more movement of people and goods helps diversify and commercialize the economy and facilitates information flow. Nigeria total road network is 194,800km, by which the federal government handles only 22 percent of the road, local government handles 57 percent and the state government handles 27 percent of the road kilometers in the country.
(Sanusi CBN 2012)

Nigeria currently has 22 Airports, with four international currently functions in the city of Lagos, Kano, Abuja and Port Harcourt. (Wikipedia 2012)

Nigeria has about 120 million Mobile GSM subscribers and 9 mobile operators (Nigerian communication Commission 2012)

Electricity is the number one major problem in Nigeria. The country is one of the African nations with low availability of electricity in the world with consumption lower than many African countries; South Africa with a population of 49 million provides 97 percent more of electricity than Nigeria by generating 44,000 Megawatts while Ghana generate 2,111 Megawatts with a population of 24millions and Nigeria provides about 4,000 Megawatts with a population of 170 million, which is a major setback for foreign investment in the nation.
(Nigeria electricity expo 2012)

In the Vision 2020 agenda, Nigeria planned to generate 40000 KW of electricity, but the target cannot be reached due to challenges facing in the sector like corruption and lack of vision practicalities by the government. For the project purpose, only a minimal infrastructural demand will have an effect in implementing the project in the nation.

In the Africa continent, Nigeria has been advancing in the road, power, rail, and ICT sectors. Furthermore, a net contribution of about one percent point to Nigeria’s developed per capital growth through infrastructure despite the fact that unreliable power supplies hindered its growth. (Foster V., Pushak N. 2011)

Many challenges still exist in the power sector of the country; its power sector's cost recovery and operational efficiency are among the worst in the continent, which only produce about half of what is needed in the country. Nigeria sanitation and water sector are inefficient in its operations, with the decline and low level of piped water supply. Road networks are in bad condition with improper maintenance, air transport safety has a poor record; irrigation development is relatively low to the level of potential in the nation.

The government determined to raise 14.2 billion USD, annually for the next decade, which is about 12percent of the country GDP to solve its infrastructures through the strength of the abundant of oil revenues, national economy and efforts at electricity and other improvement to management and operations. (Foster V., Pushak N. 2011)

Nigeria has started to adopt different initiatives that include- Concession, Public Private Partnership (PPP) and Privatization. Furthermore, Nigeria has been attracting interest and investment from multi-lateral sources such as African Development Bank, China, and International Development Association (IDA). (Business Day news/CBN 2012)

2.5.6 Environmental issues and effects of climate change

An environmental issue in Nigeria is a complicated thing. Its total land area is 923.768 sq.km occupied by 170,123,740. Soil degrading; rapid urbanization; rapid deforestation; loss of arable land; urban air and water pollution; damages from oil spills; desertification; over population; and all kinds kind of oil pollution –water, air, and soil are some of the resultant effect of man's communication with his environment (CIA 2012 EST).

Investing in renewable technologies in Nigeria will even limit some of the environmental issues is been experienced in the country by combating global warming and other problems connected with environmental hazards like fossil fuel, oil spills and many more.
(Michael Brower 1992).

Nigeria also signed an international agreement on environmental solution with Biodiversity; ozone layer protection; Climate change; ship pollution; Climate change-Kyoto Protocol; Marine Life conservation; Desertification; Endangered species; Wetlands, Law of the sea and Hazardous Waste. Till date none of this signed international agreement has been ratified (CIA World Fact 2012)

With the strict environmental standards for renewable technologies usage, I believe its environmental issues will be less considered due to its low impact. It will also bring out the recognition of cleantech in Nigeria and the whole of Africa.

2.6 Legal Factors

2.6.1 General legislative system and enforcement of legislation

Legal system is refers to a system which was created by ancestors to give justice so that harmony and peace prevailed in the community.
In due time legal system changed to sought up with the growth development of mankind. (Justice Diary 2011)

Nigeria legal system is constituted on English common law, and its source is the Doctrines of equity and Common Law; Judicial precedent, Customary Law such as the Sharia and Islamic Law; Nigeria law via its legislature and the English law.

The Nigeria legal system constitution undergoes a reform in the year 1999, when the country changed to a new democratic nation. Its constitution regulates the distribution of legislative business between the houses of assembly and the national assembly; all 36 states and Federal Capital Territory (FCT) Abuja have its own laws.

The 1999 Nigeria constitution is confirmed to be most important law of the nation which is available on the webpage: “http://www.nigeria-law.org/ConstitutionOfTheFederalRepublicOfNigeria.htm” The order of Preference of the court system is The Supreme court, the court of Appeals, Federal high courts and its court of state, Customary and sharia court of appeal, magistrates and the district court, customary, sharia and area courts and other tribunal laws in a different region of the country.
(Dina, Akintayo and Ekundayo 2005)

For this project purpose, the legislature rules and regulations of the Nigeria ministry of energy in Nigeria will be in charged and other investment and protection agency that worked with the rules of laws guiding business investment in the country such as the standard organization of Nigeria will be responsible for the project in other to help to fulfill the responsibility in protecting the consumers of Nigeria. (SON 2012)

2.6.2 International law and implementation of international regulations

International laws lay down standard, principles and rules that govern the nation and other partakers in international affairs in their relation with each other. The purpose of international law is to solve problems of a global or regional scope, adoption of common for multilingual activities and regulations of areas outside the control of any nation; which can be traced to. Every nation is expected to follow the rules and regulations of the international law. Some nation provides subjugation of international law to their regional law while some makes it automatic into the law of their nation. International law signals Nigeria credible commitment when dealing with other parties in the future. (Elizabeth A. OJI 2010)

In Nigeria, International laws and regulation and its implementation concerning Money laundering, Cyber Crime, Corruption, terrorism, human trafficking etc. is enforced and ensured, since the country become a member and make an agreement with some of the international and regional organizations such as African Union (AU), United Nations Security Council(UN)

2.6.3 Legislations related to starting a company

There is legal policy that must be obeyed before starting investment or business in the country, which depends on the type of areas of business investors planned to key invest. However, starting a business in Nigeria requires the investors to have 10 times start-up capital of income per capita; has a minimum turnover of 100 times income per capita, not owing a real estate etc.

According to the World Bank Doing Business in Nigeria Data report, says starting a business in Nigeria requires 34 days, 8 procedures steps to be followed in starting a business in Nigeria some steps involve payment and some are not depending on the sector of investment. The procedure will be described below.

2.6.4 Availability of company name through Corporate Affairs Commission

This is a process of registering the company name in the CAC registration system and check if the name is already available or not. These processes take 5 days, with 200 Naira, equivalent to 1 Euros application forms.

2.6.5 Preparation of the required document

This is a process whereby the owner submit required document for the company, completion of status form, preparation and printing of Article of association and Memorandum, and payment of stamp duty to the Federal Inland Revenue Service (FIR) which takes 7 days to perform the process.

2.6.6 Declaration of Compliance must be notarizing:

This document must be notarized by the solicitor in either the federal high court or state high court, which takes a day from 250 to 500 naira equivalent to 1.30-2.50 Euros

2.6.7 Payment application into the CAC Bank account

Payment of the application must be made into the CAC account with the submission of the additional forms such as article of association and memorandum stamped by the solicitor (2 copies) CAC 3 form, form CAC 7, notice of registered address, and particulars of directors, share capital and return of allotment of shares statement.

2.6.8 Registration of Income VAT and income Tax

The applicant will complete the VAT and income tax application form with the federal Board of Inland Revenue of the ministry of finance, submission of tax clearance certificate and registration of the income tax purposes at the tax office which will need to submit document such as Taxpayer registration form TRIF/2006/001COYS, Letter of appointment of a tax adviser and corresponding letter of acceptance, Directors' names and addresses. - Tax advisor's name and address, Names and address, Phone Numbers of the chairman of the company and main promoters with their email address. Name and address of chairman of the company including, managing director, the principal accountant, officers legal adviser and copy of Memorandum and articles of association, copy of Certificate of incorporation and completed Federal Inland Revenue Service (FIR) questionnaires; this takes 4 days with no payment charges.

2.6.9 Registration of Personal Income Tax

The tax PAYE must be registered at the state Tax office; all the company employees must be registered for the sake of income tax withholding, and a copy of certificate of incorporation attached with a reference file. This takes 2 days with no payment charges.

2.6.10 Local Government inspection of the company

This process is the practice in Lagos state takes seven days with no payment charges.

2.6.11 Other additional payment

This additional payment will be paid at their designated Bank depending on the rules of law and regulations of the states at which the company is situated. This takes a day with charges depending on the region. . (Doing business 2012, 15-24)

2.6.12 Employment legislation

The employment legislation in Nigeria is been handle by the Nigeria Labor Congress (NLC) whereby most employed Nigerians registered under the umbrella of NLC. The Nigeria labor congress was (NLC) been formed in the year 1975 and recognized in the Nigerian legislative system (LAW) in 1976. The Nigeria labor congress (NLC) is composed of a national executives and states council in all the states and a secretariat located in the capital city of the country. (Onyejeli, 2011)

The Nigeria labor congress (NLC) fundamental Aims and objectives are to defend, promote and protects the interest of all workers and their well-being; rights, trade unions and pensioners; to defend and promote a Nigerian nation that would be democratic, transparent, just, and to be prosperous and advanced the cause of the employing class by this attained rules. To defend the rights and promotes the well-being and interest of the employed in their working environment in defending and advance the economy social and political welling being of the employed citizens and promote; To enhance the income of workers, quality of life; To maintain and sustain the unity of the nation, ensure total unity of all employed citizens irrespective of their status, political beliefs and their states of origin; To defend and promote the human right, trade union, democratic governance and the rule of law;
To defend and promote the democracy, civil governance, transparency and probity in the trade unions; To work for the prosperity and urbanization of the nation and always ensure full employment, human working environment and protection of jobs; To publish and print literature for the purposes of achieving and enhancing the purpose of the union congress;
To cooperate with other organizations that the union has a common vision and interest for the improvement of the working force; to ensure financial stability for the union and congress by engaging in business that can brings more financial breakthrough for them. (NLC 2012)

The Nigeria labor congress has small sub regional union which works under them. Occasionally, all the union member are informed in case of any emergency meeting i.e. organizing a national strike due to a breakdown in communication between employers, unions and workers happened which result to lock-outs and strikes actions. (Ngozi Onyejeli 2011)

The Nigeria labor Acts contains the general protection and provision of salary and wages, contracts of employment, and condition and terms of employment. Recently the employment rights Act was amended by the employment Relation Acts of the year 1999 and 2003 which provide a variety of contractual right for workers, such as Entitlement to a paid statement that is being itemized; Protection against unfair work dismissal and entitlement to the Minimum wages of the nation laws and working terms and condition must be documented. All the labor acts have different rules and regulations that are attached to each of them all which is available on the webpage of the laws of the federation of Nigeria. "http://www.nigeria-law.org/LabourAct.htm"

3 Energy market in Nigeria

3.1 The general electricity situation in Nigeria

The Power Holding Company of Nigeria (PHCN) is in charge of the electricity production and supply in Nigeria. In the infrastructural development of Nigeria, electricity generation has been one of the major setbacks for the growth and development in the nation. With the vast explorations and reserve of oil and gas in the country, Nigeria installed about 6000 Megawatts (MW) of electricity, of which barely 4500MW is generated for use because of the poor facilities maintenance. It electricity demand is about more than 15,000 MW is less than Egypt and South Africa.

The government is in charge of the electricity distribution and generation in the nation under the umbrella of Power Holding Company of Nigeria PHCN, which was formerly called National Electric Power Authority for the past 30 years and the energy sector has suffered low investment. (RUMUNDAKA WONODI/Geometric power 2012)

Currently only 50 percent of the country totals population has access to electricity. The solar energy society of Nigeria and the Nigerian Energy Commission have been tasked with generating solar –power energy solution for the rural area that are not supplying with electricity by the national power grid. Nigeria electrical power demand is high, and generation is below demand, which resulted in energy crisis and further development of hydropower resources to calm the crisis planned by the government. Despite the experience of power failure in the

country, it still exports electrical power to Niger, Chad Benin republic and Togo on a regular basis. (MBendi 2012)

Furthermore, the Nigeria government has planned to privatize the power sector by introducing Independent Power Project (IPPs) to generate power and distribute it to PHCN. However, a construction of four thermal power plants in 4 different cities has been approved by the Nigeria government with a combined capacity of 1234 Megawatts (MW) to meet its generating supply. (Abubakar S. Sambo 2009)

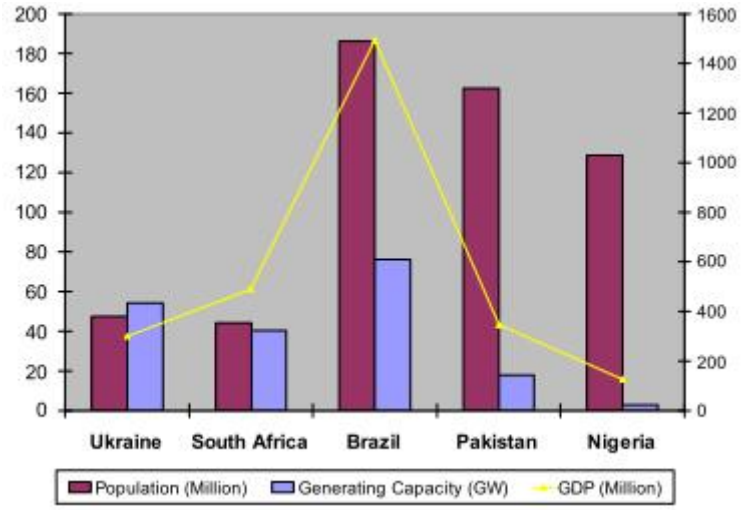


Figure 26: Nigeria power generation relative to Population
Source: Oando 2008

The above diagram illustrate some list of the Organization of the Petroleum Exporting Countries (OPEC) countries level of power generation relatively to their population, and Nigeria's per capita power generation compared to other countries generation is extremely low; its GDP also indicate low generation, which affect the growths and developments of the energy sector. (Oando 2008)

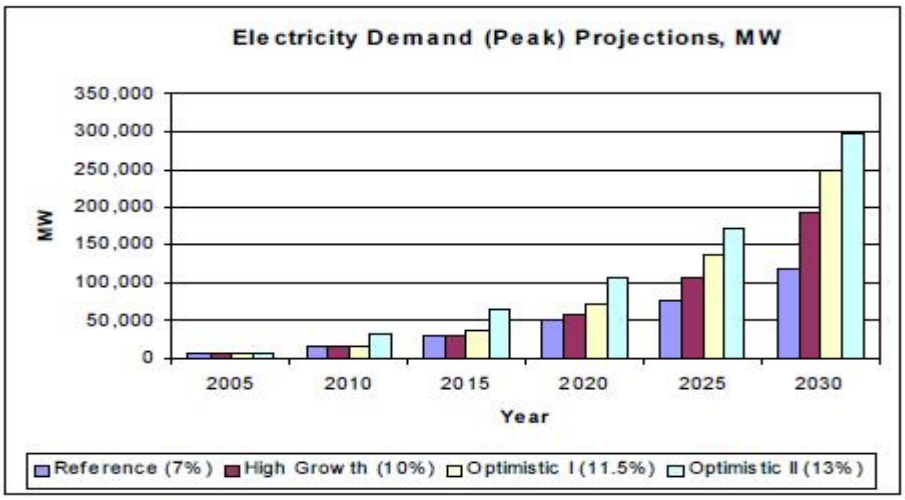
3.2 The Demand and Supply of electricity in Nigeria

Electricity plays a vital role in the technological development and socio-economic of every nation. In Nigeria, electricity supply is epileptic in nature, and demand is far outstrips to the supply. Despite the availability of natural resources in the country, it's still faced with various electricity setbacks, which is hindering the growth and development of the nation.

For the past twenty years before the 1999, there was no sign of substantial investment in the nation infrastructural development. Since the year 2001, power generation installation went up and down gradually from 5,600 MW to 4477MW as compared to a heavy demand of 6000MW. Furthermore, Out of the seventy-nine installed power generating units; only nineteen were in operating mode.

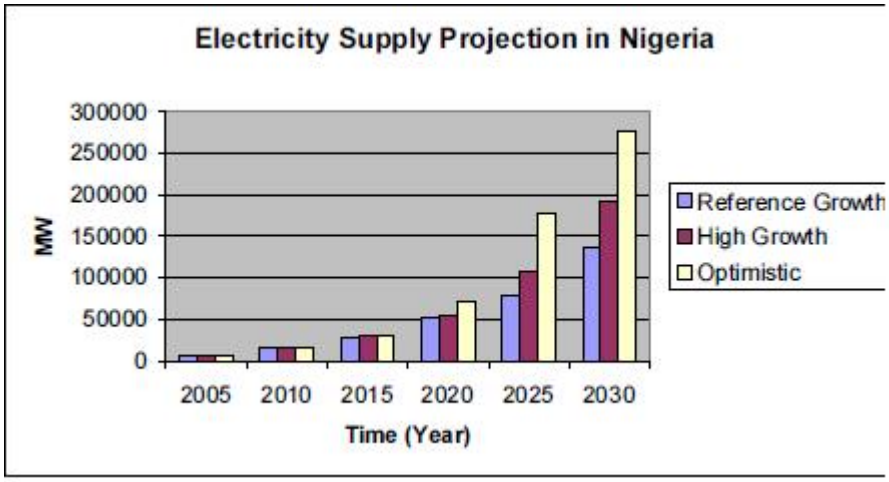
Since the commission of the Energy Commission of Nigeria (ECN) in the year 1979, the government has been adding my efforts in solving the problem of the electricity sector in the country, by carry out overall policy co-ordination and energy sector planning. They also collaborate with the international Atomic Energy Agency (IAEA) under different projects to build capacity building for the determination of the actual energy demand and energy planning and strategic supply for the each country participating the past thirty years (30) time horizon. The implementation of the projects requires a country study team (CST) and the establishment of the Working Team (WT) both which include the vital public and private stakeholders in the country energy sector. The technical experts in the project work team will implement the project and submit the final report to the Country Study Team (CST), which is known as Steering Committee for the project on a daily basis.

The energy demand and supply projected diagram by the country study team (CST) and the establishment of the Working Team (WT) from 2005-2030 can be analyzed from the below diagram. (A. S. Sambo 2008)



IAEA/ECN 2007&Sambo 2008

Figure 27: Electricity Demand Projection in Nigeria



IAEA/ECN, 2007/Sambo 2008

Figure 28: Electricity Supply Projection in Nigeria

The above diagram illustrate some list of the Organization of the Petroleum Exporting Countries (OPEC) countries level of power generation relatively to their population, and Nigeria's per capita power generation compared to other countries generation is extremely low; its GDP also indicate low generation, which retard growth and development of the sector.(Oando 2008)

For the purpose of this project, since the demand is very high than supply, it will be good for the Finnish renewable companies to act fast in their investment so as to gain more ground and stability of the renewable energy investment in the Nigeria.

3.3 Renewable energy market in Nigeria

3.3.1 Current situation and outlook of the renewable energy market

According to the CEO/ Managing director of BGL Private Equity Limited, Dr Chris Omeruo, during the delivering of his paper title "Promoting renewable energy option in Nigeria: pinpoint on Public Private Partnership (PPP) for effective and fervent delivery" which says "Energy Market in Nigeria is estimated to worth about 7.5 Billion US Dollars, which is equivalent to at least 6.1 Billion Euros with a market potential growth to worth more than 10Billion US Dollars" he also said renewable energy refers to the use of biomass, wind, solar energy and small hydro option to generate electricity, and it has the potential to create over 10,000 jobs for the citizens of the country.

The demand for renewable energy in the country is being driven by the increase and urbanization access to energy intensive technologies, product and the industrial growth.

Nigeria is also among the forty-one countries in Africa that acknowledged and endorsed the Twenty-one Agenda as an action program for sustainable development and a comprehensive institutional framework. A vital recommendation of the 21Agenda is the transition and initiation in rural economies from unsustainable energy sources to diversified and structured resources. There are also various ways of funding renewable energy projects in the country which includes the Nigeria government driven approach through its organizations and agencies funding the entire project if necessary.

Other options are the driven approach by the private sector which involves the handling of the whole project to the private sector through various schemes including multi-lateral approach and concessions through institution such as UNDP, World Bank, GEF etc., providing grants and development assistance to fund various Programme and development projects. (Sunday Williams 2011)

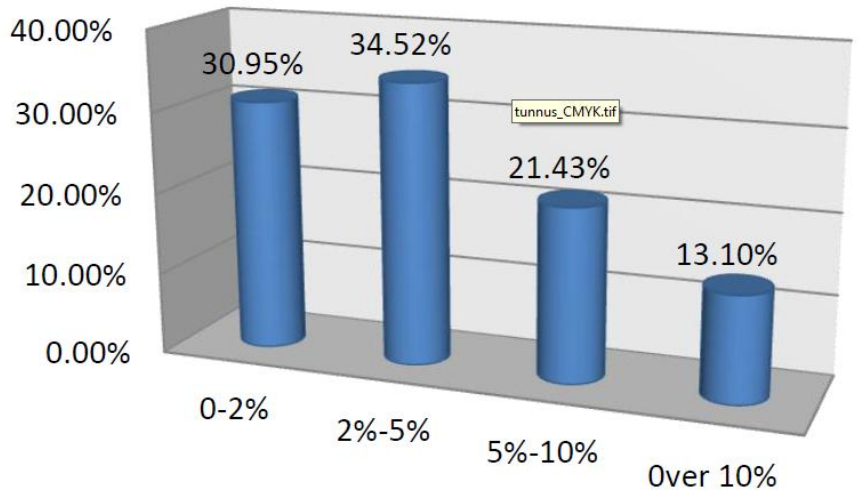


Figure 29: Level of Renewable Energy Production in Nigeria ('%)
(Suleiman Lawal Nadabo 2010)

The above figure illustrates the level of renewable energy production in Nigeria. Different options were chosen for the percentage rate of electricity that is produced by renewable energy resources in the country. It also shows that Nigeria has large natural resources that can be used as energy resources and Government and non-government organization have activate

their R&D in other to increase the growth and development of the electricity generation in the country.

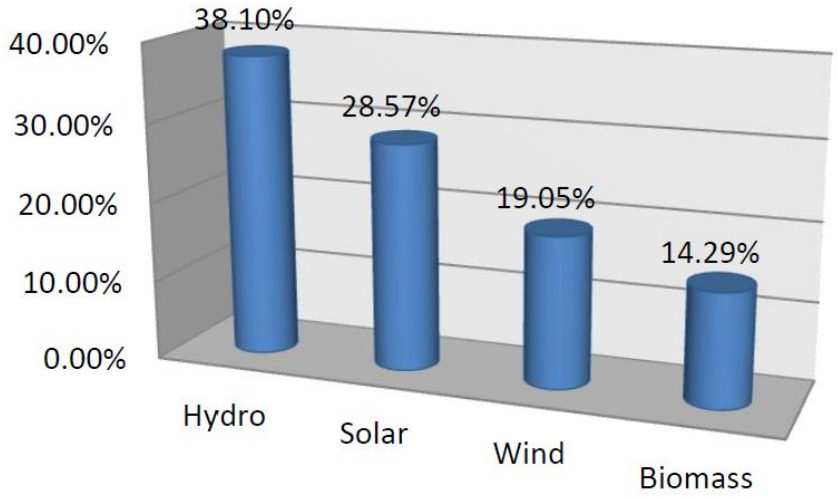


Figure 30: Level of Popularity of Renewable Energy Resources in Nigeria (%)
Suleiman Lawal Nadabo 2010

The above figure illustrates the differences and level of popularity of the four renewable energy sources in Nigeria. Hydro has been the highest and the most favorable means of energy generation in the country with 38.10 percent.

Due to the high intensity of sunlight in the country, solar energy generation has been on higher demand and supply for consumers that lack access to electricity in the rural environment. Wind and Biomass are the least favorable source of renewable energy generation in the country with 19.05 percent and 14.29 percent.

3.4 Energy Policy and Renewable Energy

Renewable energy policy can be refers to the importance driver of the growth renewable energy use. (Wikipedia 2012)

In the year 2003, the federal executive council (FEC) approved the entire National Energy Policy in Nigeria, which articulate for the usage of the viable energy sources for the national development sustainability with the effective and active preparation of the private sector in

the economy. The policy covers energy conservation and efficiency and renewable energy are listed among the energy type constituted or articulated in the policy. (A.S Sambo 2011)

There were five broad objectives that were introduced by the indeed renewable energy Component and the National Energy Policy (NEP) which can be listed as follows
To increase energy access mainly in the semi urban and rural areas, to enhance energy situation in Nigeria by reducing the risk in energy supply mix, to protect the mitigate climate change and environment and to facilitate empowerment and employment creation.

In the year 2007, the incentives and biofuel policy which articulate for the use of B20 and E10 as automotive was the Federal Executive Council (FEC) which is being review by the Ministry of Petroleum. They also articulated some policy that Nigeria will continue to focus and engage effectively on the growth and development of electric power with the view making stable and reliable electricity with availability to seventy-five percent of the total pollution by 2020 as well as broaden and different energy options for power generation. Natural gas developments and exploration and extensive crude oil shall pursue with the views and aims of increasing their level of reserves based to the maximum or highest level possible.
(A.S Sambo 2011)

3.5 Government Authorities and supporting institutions in Nigeria

There are few government authorities and supporting institutions that help to develop the use of renewable energy use in the country. Such as the Energy Commission of Nigeria, The Energy Commission of Nigeria is an apex of the Nigeria government which helps to carry out the entire energy sector polity and planning implementation, promote the risk of the energy resources through the optimal utilization and development of all, including the introduction of alternative and new energy resources like Wind, Solar, Nuclear energy and Biomass.

Their mandate is to prepare a periodic master plan for the coordinated and balanced development of energy in the country after consultation with the government agencies who's Functions are related to the field of supply and energy development.

They also monitor, Inspects, and coordinate the performance of the energy sectors, to ensure the National Energy Policy (NEP) is consistent. The Energy Commission of Nigeria (ECN) also advice all tiers of the government on the funding of energy production, research, distribution and development.

The commission also serves as a national center for dissemination, analyzing and gathering information relating to the field of energy from all sources. They also maintain and develop the National Energy Databank in the country. Higher institutions in Nigeria are doing a bit of less Research and Development (R&D) in the renewable energy sector; only few of the institutions are involved in the energy sector. (ECN 2012)

The Energy Commission of Nigeria (ECN) also commission five Energy Research Centers with specific Research and Technical roles.

These are as following;
The University of Nigeria, Nsukka National Centre for Energy Research and Development (NCERD), (They are responsible for research in renewable energy and solar).
The Usmanu Danfodiyo University Sokoto, Sokoto Energy Research Centre (SERC), (They are responsible for research in renewable energy and solar).
The University of Lagos, National Centre for Energy Efficiency and Conservation (NCEEC) (They are responsible for research in conservation and energy efficiency).
The University of Ilorin National Centre for Hydropower Research and Development (NCHRD) (They are responsible for hydropower research).
Abubakar Tafawa Balewa University Bauchi, National Centre for Petroleum Research and Development (NCPRD) (They are responsible for petroleum oil and gas research).
(ECN 2012)

3.6 Companies and renewable energy Organization

There are few companies, and organization that are dealing with the renewable energy technology in Nigeria which are the Luminous Inverter, Solar mate engineering limited, Chevron, Avatar Energy, new Era Energy, CREN, ICEED etc. Chevron is one of the companies that handle renewable energy sector in the country. They are the world leader in delivering and developing energy from oil and gas which is still the world the most important source of energy for years to come. (Chevron 2012)

The Nigerian Green Energy Company (Avatar Energy) is one of the renewable energy companies in the country that inspired by the need for a continuous positive impact, growth and development, diversity in the renewable energy and agricultural sector.(Avatar Energy 2011)
The new Era Energy is a specialized company that was created and based in Nigeria to source; maintain and supply renewable energy solution for the Council for Renewable Energy Nigeria (CREN) is a non-profit (NGO) multi-stakeholder organization or association which promotes the utility of renewable energy technologies in Nigeria. (CREN 2009)

International Centre for energy, environment and development, (ICEED) is among the organizations that deal with Renewable energy in Nigeria. They provide ideas that link climate change and energy policy reforms to prosper Nigeria poor form. They work with international research centers, specialist, and entrepreneurs, government agencies and Progressive Nigerian. They built different stakeholders platforms to respond to climate and energy challenges that affect the poor masses in the country. (ICEED Nigeria 2011)

Other institutions are university of Nigeria, Nsukka (National Centre for Energy Research and Development (NCERD), (They are responsible for research in renewable energy and solar). The Usmanu Danfodiyo University Sokoto, Sokoto Energy Research Centre (SERC), (They are responsible for research in renewable energy and solar).

The University of Lagos, National Centre for Energy Efficiency and Conservation (NCEEC) (They are responsible for research in conservation and energy efficiency).

The University of Ilorin National Centre for Hydropower Research and Development (NCHRD) they are responsible for hydropower research

Abubakar Tafawa Balewa University Bauchi, National Centre for Petroleum Research and development (NCPRD) (They are responsible for petroleum oil and gas research).
(ECN 2012)

3.7 Renewable energy potential in Nigeria

3.7.1 Solar Energy

Solar Energy has a lot of potential due to the high sunshine belt in the country. The total annual average of total solar radiation varies from the coastal latitudes from about3.5 kWhm–2day-1 to the semi-arid areas in the far north with 7 kWhm–2day-1. However, Nigeria receives solar radiation at the rate of about 19.8 MJm –2 day-1.

Average sunshine hours in the country are estimated to be six hours per day, and solar radiation is quite well distributed. In calabar, minimum average rates is 3.4 kWhm–2day-1; in the month of August, in Katsina state, minimum average is 3.55 kWhm–2day-1 in the month of January and in Nguru, maximum rate is 8.0 kWhm–2day-1 in the month of May. In Nigeria, if the solar radiation is at an average rate of about 5.5 kWhm–2day-1 and used to cover one percent of country land mass area of 923,773km2, then solar electricity generation is possible

at 11850x103 GWh per year which is more than one hundred times than the current electricity consumption rate in the country.

Furthermore, there are solar thermal technologies which are already developed in the country such as solar water heating for industries, households and hospitals, solar cooking, solar evaporating cooling, solar incubators, solar chick brooding and solar crop crying. In the remote locations and villages that do not have access to power supply can still you solar electricity.

Other areas that can be useful for solar electricity include medium and low power applications such as village electrification, water pumping, vaccine refrigeration, school power supply and rural clinic, lighting of road signs and traffic lighting. (A.S Sambo 2009)
For the purpose of this project, solar energy technologies will be a demand and influence in the Nigeria market.

Pictures 2: Renewable energy pilot system in Nigeria (Solar PV)
Source: A.S Sambo

3.7.2 Wind Energy

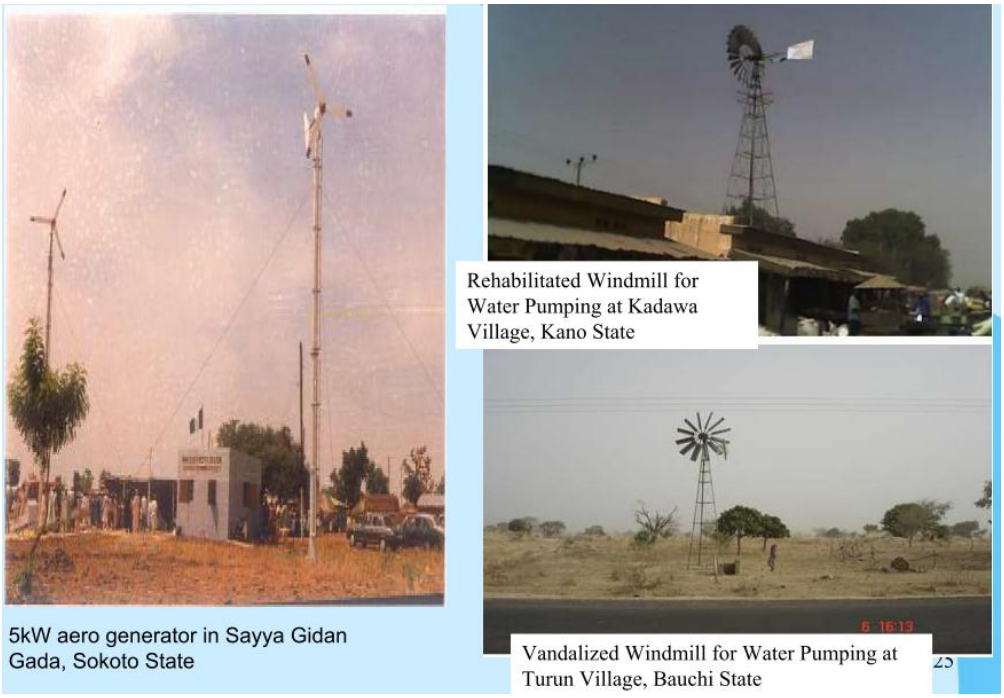
Wind is an effect from heating of the earth's surface by the sun. The resultant force inequalities are always available at the annual rate of 4.0 m/s at the far northern region and 2.0 m/s at the coastal region of the country.

Assuming an air density of 1.1 kg/m3, perpendicular to the wind direction, wind energy intensity ranges between 35.2 W/ m2 at the core northern region and 4.4 W/ m2 at the coastal areas in the country.

Wind energy has been tried in the northern region of the country, for the purpose of water pumping from the wells in different secondary school of Kano and Sokoto state as well as plateau, Bauchi and Katsina States. In the village of Sayyan Gidan Gada, in Sokoto State, a 5kW of wind electricity conversation has been generated for the village electrification.

Other areas potential of wind energy in the country is the conversion system in the country which are in "Green electricity" production integration into the national grid system and for the rural community. At one time, Tractors and Equipment (T & E), a department of the United Africa Company (UAC) produced Windmill in the country.

The Abubakar Tafawa Balewa University Bauchi and Sokoto Energy Research Centre (SERC) promised to develop the capability of wind energy technologies production in the country. There is a reasonable level usage of renewable in Nigeria; a significant increase level could be accomplished. What Nigeria needs most is the technical assistance from the Proactive countries from the industrializing nations in other to make the wind energy power generation a stable accomplishment. (A.S Sambo 2009)



Pictures 3: Renewable energy pilot system in Nigeria (Wind Energy)
Source: A.S Sambo

3.7.3 Waste-to-energy

Waste to energy is the process of heat or electricity generation from the incineration of waste sources. Most waste to energy processes direct electricity through combustible fuel or combustion, such as methanol, methane, synthetic fuels or ethanol. (All Africa 2012)

Residues associated with agriculture either as processing wastes such as corn, rice husk, palm kernel, cassava peels, and corn shell or on the farm crop wastes such as cornstalks are good sources of fuel. They are currently directly as supplement material or starter in addition to fuel-wood. They also have good potential for processing high energy content. However, other demand for roofing thatched houses and crop residues for feeding livestock's in the villages. Animal waste such as poultry dropping, cow dung, and abattoir wastes are available in specific locations in the country which is also useful for the renewable energy product.
(A.S Sambo 2009)

3.7.4 Biomass

The energy derivable from a plant source such as agricultural crops and their derivatives, trees, crops, animal waste, as well as grasses is referred to Biomass.

Biomass resources are renewable when properly managed and as they are naturally occurring, which can be harvested without significant depletion. They can also be used as solid fuel or converted to a variety of technologies to gaseous or liquid forms for electric power generation, fuel or heat for power motive.

There are various biomass resources which are available in Nigeria include, agricultural waste and crop residue, fuel wood, sawdust and shavings, industrial effluents and municipal solid waste, animal dung and poultry droppings.

The guinea savannah vegetation of the north central region of the country produces more crops residues than the Sahel savannah zones and Sudan while the rain forest in the southern part of the country generate the highest quality of woody biomass.
In the high density part of the urban areas, you can generate much quantity and quality of municipal waste. (A.S Sambo 2009)

Resources	Quantity Million tonnes	Energy Value (Million tonnes) ('000 MJ)
Saw Dust	1.8	31,433
Fuel Wood	39.1	531.0
Municipal Solid Waste	4.075	Nil
Agro-Waste	11.244	147.7

Table 6: Biomass Resources and its Estimated Quantities in Nigeria.
Source: (A.S Sambo)

Pictures 4: Biogas Digester at Mayflower Secondary School, Ikenne, Ogun State
Source: A.S Sambo

4 Interview Analysis

The private and public sectors in the country are all in need of the renewable energy technologies, such as Commercial and agricultural industries are in urgent need of the renewable energy application. However, the northern region are the most suitable for solar and wind generation in Nigeria.

All kinds of renewable energy based products are available in the country such as Solar pv, Wind and Hydro installation, solar lamps, inverters, batteries, solar touch, solar dryers, charge controllers, Bio-digesters, solar cookers etc.

This renewable energy based products level of market expansion is the main issues in the country due to the initial cost of procurement which makes it underdeveloped and reduces the rate of demand and supply of the renewable energy products in the country. The rate of demand is far ahead of the rate of supply.

The Supply rate renewable energy product in Nigeria is lacking, and it need an urgent attention which is one of CONNECT project purposes. The Nigeria government also planned zero feed in tariff for the products which is yet to be carried out. The Nigeria government has been facilitating renewable energy investors and companies to do energy business in the

country and also agree to strengthen the private sectors to invest into the energy sectors of the country.

The government and few private sectors have been the major customers of Renewable energy products in the country as a role model and admirer of the product so that other private consumer can start consuming the renewable energy products.

There is a lack of competition in the renewable energy market in Nigeria, but the only few competition is mainly between the importers of Renewable energy technologies and the foreign investor which its rate is quite still low. If the Policy, price and regulatory framework of renewable energy products set by the government is put into action, then the arena for competition in the renewable energy sector will start coming into a reality.

The risk of starting a business in the energy sector in Nigeria is minimal, and some of risk is as follows, corruption, lack of incentives, insecurity in some target cities in the country non-passage for overall energy policy, vandalization, inconsistency policy, and political risk, lack of continuity in government policy, socio-cultural conflicts, market risk and poor infrastructure.

Finally, the Future of renewable energy solution demand in Nigeria is projected for the four economic growth scenarios, 7 percent, 10 percent, 11.5 percent and 13 percent which will increase the provision of vital services in rural areas constitute about 60% of the Nigerian economy if the government adopts the right attitude towards the renewable energy products investment in the country and the growth usage of renewable energy products in the country is encouraging. I.e. the Solar usage is high; wind power is low at the initial stage; biomass is still undergoing research and development process, and waste to energy is yet to be explored. According to the response gotten from the questionnaires, solar, wind, hydro, & bio-energy are the vital resource that is available in the country.

5 Conclusions

Renewable energy solution in Nigeria is considered a feasible to the energy setbacks and challenges in the rural and urban areas of the country.

There is a lot of potential, in renewable energy resources in Nigeria. This will be a potential solution in reducing the energy crisis in the country. Nigeria generates about 5000 megawatts of electricity which is below requirements compare the number of population of the country. Being one of the most endowed countries in the African continent, it rural areas has access to electricity with less than 48 hours in a week while the urban areas has less than 84 hours in a week.

Electricity problems are the main setbacks in Nigeria and due to shortage of electricity power in the country, many industries had moved to nearby countries where there is full access of electricity for then to operate their businesses.

The Electricity Projection demand in Nigeria is 100.000 MW by the year 2020, which is a huge opportunity for the Finnish companies to start the provision of their renewable energy solution in Nigeria.

There is a sign of vast opportunities of investing in renewable energy business in Nigeria and governments have sets out facilities and incentives policy that will benefits investors in the energy sectors.

Based on the vast population and energy need in the country, it is expedient for Finnish SMEs to start taping into the renewable energy investment opportunities in Nigeria and all sectors in the country are in demand for energy rehabilitation for business stability will boost the business and investment opportunities that are bound in the country.

The private and public sectors in the country are all in need of the renewable energy technologies, such as Commercial and agricultural industries are in urgent need of the renewable energy application. However, the northern region are the most suitable for solar and wind generation in Nigeria.

“Energy Market in Nigeria is estimated to worth about 7.5 Billion US Dollars, which is equivalent to at least 6.1 Billion euros with a market potential growth to worth more than 10 Billion US Dollars”, (Dr Chris Omeruo 2011)

Due to the high intensity of sunlight in the country, solar energy generation has been on higher demand and supply for consumers that lack access to electricity in the rural environment.

Wind and Biomass are the least favorable source of renewable energy generation in the country with 19.05 percent and 14.29 percent.

In Nigeria today, more than 20 million households and almost all public institutions use firewood for cooking using traditional three-stone fires which is common in the rural areas and the urban areas as well. Urban areas depend on primarily on firewood for cooking which is serious to health, economic and environmental problems. About 95,000 of Nigerian women and children die annually because of indoor air pollution from firewood smoke (WHO, 2010) Also firewood has become a commercial fuel; with the increasing cost and scarcity of kerosene and LPG. Nigeria capital, Abuja, households spend as much as N4.000 every month on firewood. And of course, millions of cooking fires emit greenhouse gases every day, which magnitude may be overwhelming if quantified. So there is need for the adoption of clean cooking technologies including LPG, kerosene, biogas, biofuel and efficient woodstoves.

Off grid rural electrification from renewable will also benefit the country immensely. About 60% of Nigerians lack access to grid electricity and majority of them are in the rural areas. Nigeria lies close to the equator and therefore receives enough solar radiation. This resource can be harnessed for rural electrification. The nation has about 734MW small hydro potential and majority of these rivers are located in rural areas that lack access to grid electricity.

Another fuel that can solve Nigeria's energy needs is natural gas for electricity generation. Though this resource is not renewable, it has low carbon content compared to petrol and diesel. Nigeria is the second highest gas flaring nation after Russia.

Nigeria flares about 17 billion tones' of gas annually producing about 45 billion tones' of CO2. It also shows that this amount of gas be used to generate more than 24,000MW of electricity per day, enough to supply the whole country

There is a reasonable level usage of renewable in Nigeria; a significant increase level could be accomplished. What Nigeria needs most is the technical assistance from the Proactive countries from the industrializing nations in other to make the wind energy power generation a stable accomplishment. (A Sambo 2009)

Finally, Finland energy companies should activates their moves in investing in the energy business in Nigeria before it is too late. There is an African adage that says, an opportunity comes, but once. Many Nigerians students and graduates in Finland can be of help in assisting the Finish companies to starts energy business in Nigeria.

Since, they are of the Finnish educational products that studied in Finland and understand Finish and the Nigerian business culture, which will be of advantage and benefit for both the Finnish companies and the unemployed Nigerian graduates living in Finland and ready to work for the Finnish companies in Nigeria.

The Nigerians students and graduates in Finland are ready to work with the Finnish companies in starting energy business in Nigeria with tested and trusted mindset.

Finnish Small and Medium enterprises (SMEs) have already started investment in Nigeria such as Abloy OY, Nokia and Wartsila. Others SMEs are invited to tap into the renewable energy opportunities in Nigeria.

5.1 Future Research

After collecting different information's about renewable energy market entry in Nigeria, its shows that Nigeria has a lot of renewable energy potential that need to be unravel in the nearest future.

Waste management system is one of the areas that can be research on in the Nigerian environment. Successful segregation of waste in the rural and urban areas will bring out the availability of energy in each states of the country.

However, introduction of R & D laboratory research in the Nigerian higher institutions for depth knowledge on renewable energy resources.

5.2 Recommendations

Based on the thesis result, the following recommendations were made available. CONNECT project Lab must have a constant renewable energy research for Nigeria on a yearly basis due to the new updates in the energy sector. This informs the Finnish business investors to new information that enforces the energy sector to know the next step in taking in their business strategic approach.

The CONNECT project would also help the NGO that deals with renewable energy research to them develop their renewable energy R&D for authentic information that would be helpful for both parties in Nigeria. The northern region are the most suitable for solar and wind generation in Nigeria.

The renewable energy project should be a breakdown into segment of having two students working together on the same project into different areas; one can concentrate on the renewable energy resources potential and the other on the business centric areas.

There is a need to train inexperience labor force on the design, construction, maintenance and operation of the renewable energy tools to embrace the mass commercialization and production of renewable energy systems.

Due to insecurity in the country, it is an advisable for the Finnish companies to put a hold in the provision renewable energy solutions in the northern part of Nigeria until the crisis is solved.

The south part of Nigeria is good for the introduction of the renewable energy solutions and after the crisis in the north; they can now shift to the northern region which has a better solutions in the solar system.

Every sector in Nigeria can benefit from using renewable energy. However, intervention is will be mostly needed in household energy and rural electrification using small hydro and solar off grid systems.

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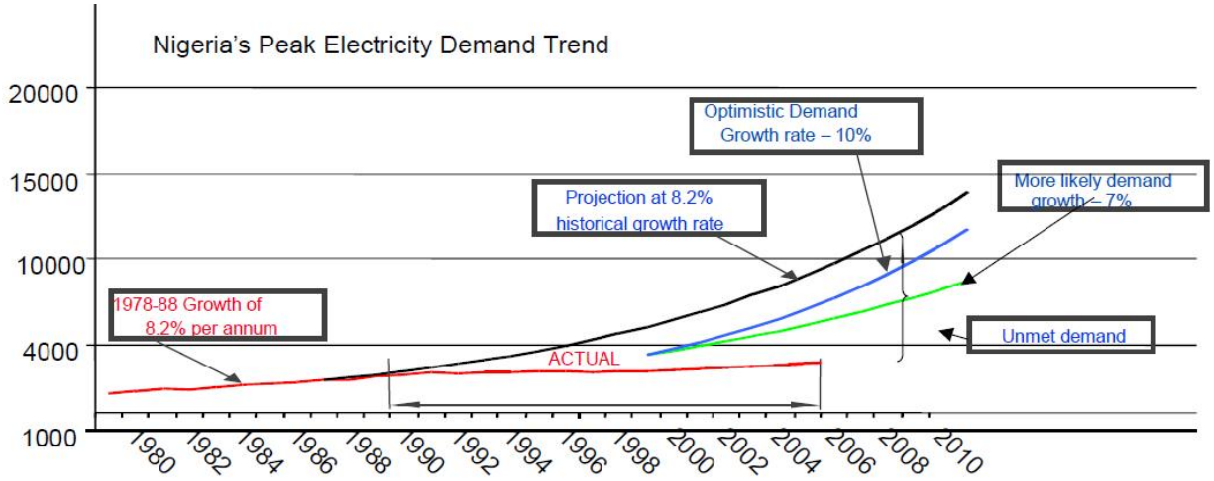
Figures

Tables

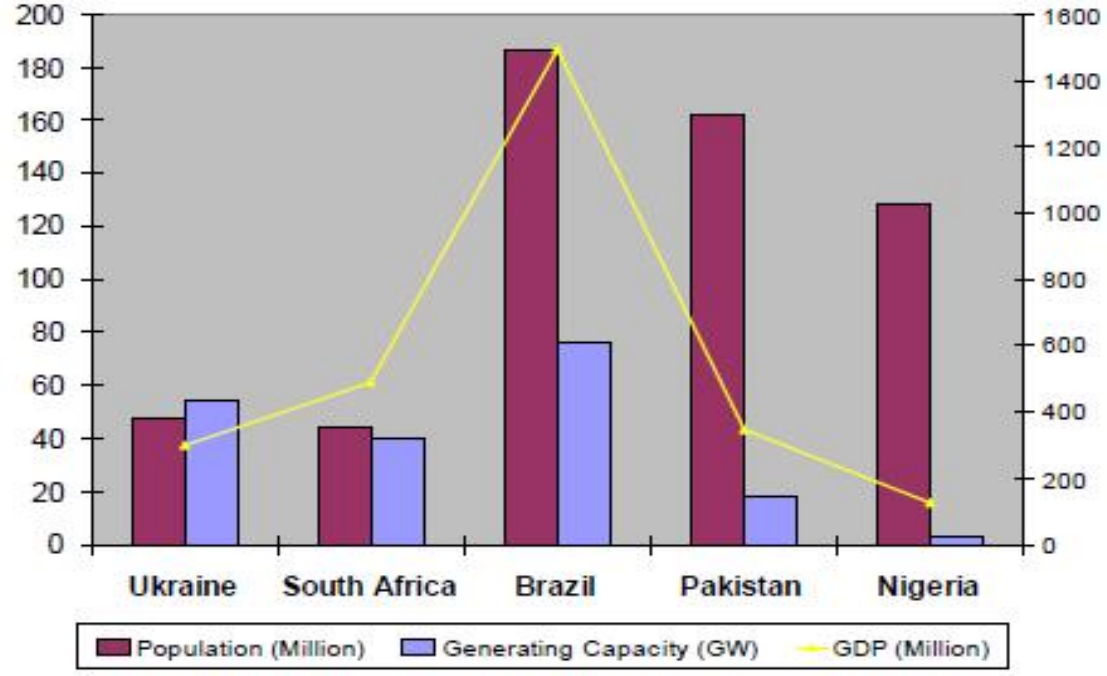
Pictures

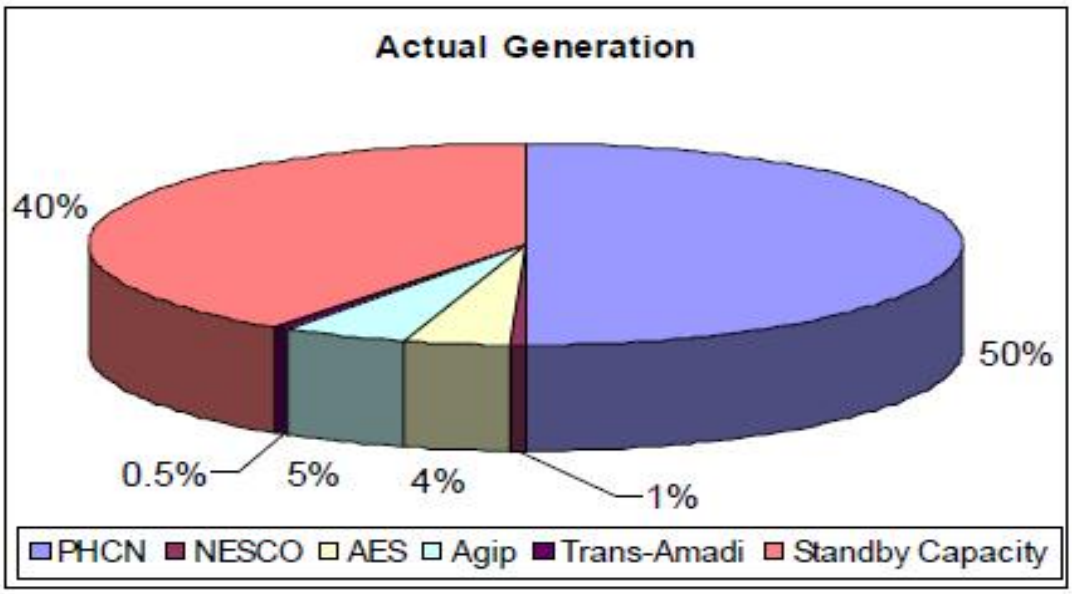
Appendix

Appendix 1: Nigeria's Peak Electricity and Trend



Appendix 2: Electricity Generation Statistics

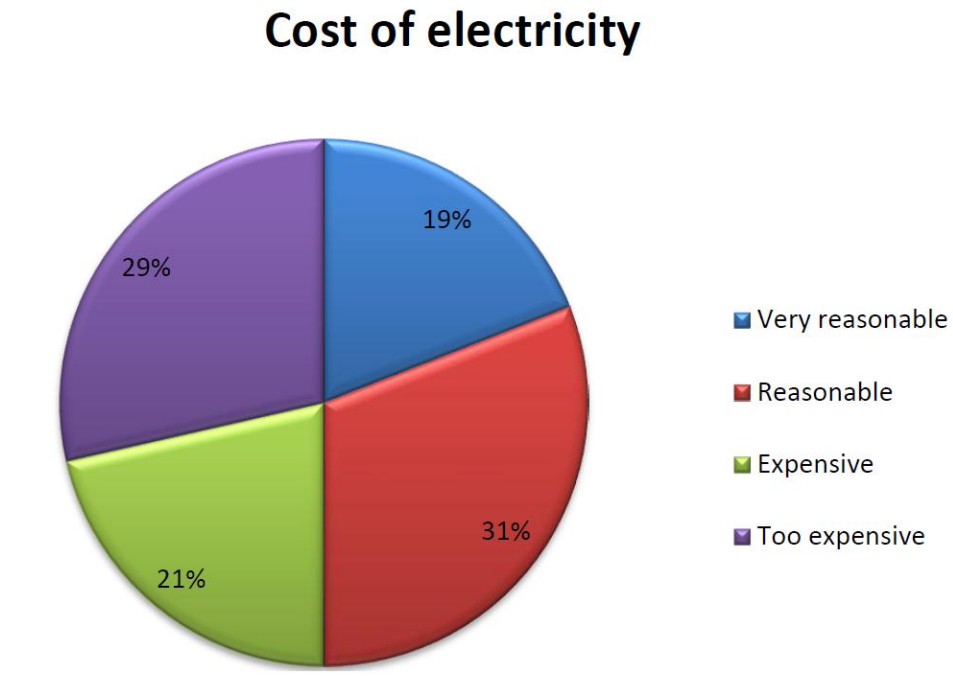




Appendix 3: An Aerial Diagram of the World at night

Source: A.S Sambo

Appendix 4: Cost of Electricity in Nigeria



Source: Suleiman Lawal Nadabo 201

Appendix 5: Energy Resources in Nigeria

S/No	Resource Type		Reserves (Natural Units)		Production/ Consumption
1	Crude Oil		35 billion barrels		0.73 Billion barrels/yr
2	Natural Gas		187 Trillion SCF		2.4 Tcf/yr
3	Coal and lignite		2.175 billion tonnes		Negligible
4	Tar Sands		31 billion barrels of equivalent		Negligible
5	Hydropower large		11,500		1,900 MW
6	Small Hydropower		3,500 MW		30 MW
7	Solar Radiation		3.5 - 7.0 KWh/m^2/day		2 MW
8	Wind		(2-4) m/s at 10m height		Negligible
9	Biomass	Fuelwood	11 million hectares of forest and woodland	Excess of 1.2m tonnes/day	1.2 million tonnes/year
		Animal waste	211 million assorted animals		
		Energy Drops and Agric Residue	72 hectares of Agric. Land		
10	Nuclear				

Source Energy Commission of Nigeria (ECN)

Appendix 6: First questionnaire

1. What are the most important sectors that need solar, wind and bio-energy usage in Nigeria?

Answer

Solar thermal

The market for solar thermal energy exists initially in the following sectors: institutional (hospitals, hostels, etc.), commercial (hotels, restaurants, etc.), industrial (bottling plants, dairies, juice extraction factories, malt preparation, etc.). There is limited opportunity for solar water heaters in the Nigerian domestic sector in the high elevation areas of Plateau and Mambilla which experience near-temperate climates during the harmattan season.

Solar PV

The country is exposed to a high solar radiation level with an annual average of 3.5 – 7.0kWh/m2/day. The major drivers for the PV market in Nigeria include unreliability of grid power supply as the private sector use solar energy as back up; governmental sponsored remote power supply as well as international agencies, NGOs and individuals. Other drivers are: the unreliability of grid power supply which has created a market for solar energy as back-up for communication companies and several banks. This segment of the market has grown partly through the activities of PV entrepreneurs.

The health sector and the agricultural sectors also use solar PV for vaccine storage and irrigation respectively.

WIND

The first Wind energy in Nigeria is ongoing. However, wind energy will be suitable for industrial application.

Biomass

In Nigeria, biomass account for ninety-five percent of rural energy use, the diminishing stock of fuel wood will compound the problem of poverty reduction and challenge efforts to em-

power women, children and fuel wood merchants. Biomass energy accounts for 37% of the aggregate national energy demand.

2. What are the renewable energy products that Nigeria requires most?
Answer

The renewable energy products that Nigeria requires most are Solar Modules, Inverters, Solar lamps and solar phone charging systems, small hydro, and efficient bio-energy technology i.e. improved biomass briquettes.

2. What kind of renewable energy based products exist in the Nigeria Market?

Answer

The kind of renewable energy based products that exist in the Nigeria market are Solar Modules and recently solar lamps, inverters, charge controllers, batteries, solar touch, solar dryers, solar cookers, Bio-digesters.

3. What are the geographical areas where wind and solar electricity generation will be most suitable?

Answer

WIND

Wind resources in Nigeria are however poor - moderate, and efforts are yet to be made to test their commercial competitiveness.

It is also observed that the wind speeds in the country are generally weak in the South except for the coastal regions and offshore, which are windy. In the coastal areas and in the large areas offshore from Lagos State through Ondo, Delta, Rivers and Bayelsa States to Akwa Ibom State, potentials exist for harvesting strong wind energy throughout the year. Except for maritime activities and fishing, there is hardly any obstacle to wind farm development for nearshore wind energy farms. Inland, the wind is strongest in the hilly regions of the North. The mountainous terrains, especially in the middle belt and the northern fringes of the country, where prime wind conditions may exist are to a large extent sparsely populated, and extensive areas for wind energy development exist in these locations.

Due to the varying topography and roughness of the country, large differences may exist within the same locality. Hence within a few kilometers, the wind speed may vary.
The values range from a low 1.4 to 3.0m/s in the Southern areas and 4.0 to 5.12m/s in the extreme North. Peak wind speeds generally occur between April and August for most sites. Initial study has shown that total actual exploitable wind energy reserve at 10m

height, may vary from 8 MWh/yr in Yola to 51 MWh/yr in the mountain areas of Jos Plateau and it is as high as 97 MWh/yr in Sokoto.

SOLAR

The annual average of total solar radiation varies from about 12.6MJ/m2-day (3.5 kWh/ m2-day) in the coastal latitudes to about 25.2 MJ/ m2-day (7.0kWh/ m2-day) in the far north. This gives an average annual solar energy intensity of 1934.5 kWh/m2-yr; thus, over a whole year, an average of 6,372,613 PJ/year (≈1,770 thousand TWh/year) of solar energy falls on the entire land area of Nigeria. This is about 120 thousand times the total annual average electrical energy generated by the NEPA.

With a 10% conservative conversion efficiency, the available solar energy resource is about 23 times the Energy Commission of Nigeria's (ECN) projection of total final energy demand for Nigeria in the year 2030,

4. How would you rate demand versus the supply of renewable energy solutions in Nigeria?

Answer
Demand outweighs the supply

5. What are the tax reductions, subsidies and incentives that the local and foreign investors can gain in starting a renewable energy business in Nigeria?

Answer
Recently the government announced a zero duty of RE products but that is yet to be effective.

6. Does the government facilitate organizations to do business in renewable energy business either in import or manufacture?
Answer

Yes, the procedures are contained in the Nigeria Electricity Regulatory Commission's guidelines.

8. What are the current and future government policies in encouraging direct foreign investment particularly in energy sector?
Answer

As contained in the renewable energy master plan for Nigeria, the government aims to create stable and predictable investment climate in renewable electricity market.
It was noted that the country requires significant foreign direct investment to enable the emergence and growth of the renewable electricity industry and efforts are being made to get this going i.e. encouraging private sector, both indigenous and foreign, in the establishment and operation of hydropower plants.

9. In your opinion, who are the main customers?

Answer

- Mainly the government – street light, demonstration projects.
- Small businesses
- Households, for now.

10. How does the Nigerian government help to promote foreign investors to invest in renewable

•A bright prospect awaits the investors in renewable energy because in a short while, an investor-friendly feed in tariff, a good regime of fiscal and policy incentives as well as light handed regulation of renewable energy will be in place.

•Zero input duty is in place for solar modules and other renewable energy equipment. In addition are the general incentives relevant to power sector investments, including pioneer status. However, a set of additional incentives have been proposed from NERC which are currently under consideration by the relevant committee of Government. They include tax holidays and accelerated depreciation. The renewable energy power provider may also avail itself of existing power sector bond

11. How the competition like in the Renewable energy is (is) market in Nigeria?

There is not much competition yet, because the market is yet to expand, and one of the major drivers for the expansion will be price, policy and regulatory framework.

12. Who are the competing companies? For now, luminous (inverters) Solar mate

13. What are the risks in establishing the business in energy sector in Nigeria target city?

The perception of significant regulatory risks

There is lack of information and awareness creates a market distortion that results in higher risk perception for potential renewable energy projects

Policy and Political Risks

Outlined policies not adopted. Sound policies elaborately developed by government might at the end of the day not be adopted, and when adopted may not be implemented to significant levels.

Policy inconsistency

Instability and contending interests within Government
A certain risk will prevail when elements of the REMP are not properly aligned to the overall economic policy thrust of the government or are at cross-purposes to some broader energy policy objectives.

Risk of policy implementation short sightedness. A certain degree of policy short sightedness characterizes the implementation of policies of the country.

Lack of continuity in government policies. The present government has embarked on several reforms leading to increased liberalization of the energy market, and potentially creating opportunities for renewable energy to make increased market entry. Uncertainties loom over the policy direction of the government that will succeed the present one.

Socio-cultural conflicts. Local conflicts and trade disputes often interrupt supply of some RE resources and end products. Restive youths and armed bandits, long-drawn trade disputes, electoral malpractices and endless election petitions – all create a political atmosphere that is not supportive of investments, including potential renewable energy businesses.

Market Risks

Price distortions, poor regulatory environment and inadequate infrastructure characterize current energy market conditions in the country.

However, growing the renewable energy sector will depend on a stable macroeconomic framework. Already the NEEDS outlined a number of risks that are inherent in the Nigerian economy, and they include:

• High cost of doing business in Nigeria this constrains investment and industrial production;
• Weak infrastructure; poorly implemented incentives, especially fiscal and tariff regimes;
• Massive smuggling, counterfeiting, and dumping of products;
•Lack of standardization required for international competitiveness;
• Unfavorable international trade rules
• national trade policy stance which is endemically unpredictable, particularly in the application of tariffs and exemptions, transaction costs at ports, customs clearance procedures, and the use of import bans on goods, merchandize, products, equipment and production machinery;
• Tariff and non-tariff barriers which on the average exceed those of other ECOWAS countries;
• Corruption and public sector mismanagement of policy programmes and projects;
• Excessively high percentage of the population in the poverty bracket and
• Near insignificant contribution of the manufacturing sector to the GDP – NEEDS document states that manufacturing accounts for less than 1 per cent
of Nigeria's GDP.

Weak purchasing power. The level of poverty in Nigeria is high, and increasing. This reduces opportunities to embark on fuel switching from traditional to modern renewable uses. Certain renewable technologies are comparatively expensive.

Inadequate access to investment capital. There is a major shortage of investment capital, leading to high interest rates. Several promising projects, especially in new areas like renewable energy investments suffer setbacks due to the scarcity of funds from banks and financial institutions.

Poor infrastructure. Poor infrastructure increases transaction costs and reduces the profitability of businesses. Roads, telecommunication – and in fact, access to energy is important for local manufacturing of renewable energy systems and components.

Macroeconomic factors. Changes in the Nigerian economy or contagion from the global economy can result in significantly unstable conditions for the Nigerian currency.

International Development Risks

In an increasingly interdependent world, globalization in the movement of capital, technology, goods and ideas transcend boundaries and subject plans like the REMP to pressure. Of particular importance to the success of the REMP is the global market for renewable energy technologies and the actions of other governments and international agencies.

Global market risks. Several international developments with strong impacts on the successful implementation of the REMP are outside Nigeria's control. For instance, while the objectives of the REMP are premised on lowering the cost of renewable energy technologies, such as PVs, phenomenal growth in demand from developed countries, primarily USA and Germany, have kept the

Standards and Quality Control Risks. A major constraint to the development of the renewable energy market in Nigeria is the poorly established standard and quality control of locally manufactured and imported technologies. Creating quality assurance is a precondition for building consumer confidence and in growing the market for renewable energy. Three important dimensions to issues of quality include the perception potential users, poorly developed regime for standard setting and testing as well as professionalism among operators.

Entry of unqualified people in the field. The lack of professional associations and strong entrepreneurship in emerging renewable energy businesses, particularly solar PV and improved woodstoves will result in people without the relevant professional background to enter the industry. They achieve bad publicity for the industry and make market growth difficult.

Research and Development Risks

A vibrant R&D capacity and infrastructure is crucial in achieving several objectives of the REMP. Building the capacities to launch and sustain programmes are major concerns.

Environmental Risks. Despite the known fact that renewable energy represents a cleaner alternative, certain environmental risk occurs, and these include:

• Distortion of the environment. Large and small hydro plants are known for their impacts on fish life. Wind turbines are also likely to affect bird life and cause noise pollution. Poorly managed biofuel consumption may also result deforestation. In some situations, the production of liquid fuels from biological
sources may consume so much conventional energy that their environmental effects might be questionable. In addition to these environmental externalities, what to do with these technologies when their life span expires is also an important issue. Several environmental tools could be useful in addressing
these concerns, and they include environmental impact assessment, environmental audits and environmental strategic planning.

• Human dislocation and resettlement. Hydro power plants are known to cause dislocation to local livelihoods, including farming, fishing and transportation.
In severe cases, they lead to resettlement of communities.

These environmental trade-offs must be properly assessed, and alternative approaches to meeting energy needs considered.

14. What are the legislative issue in foreign direct invest to be considered in?

15. What is the future prediction for the renewable energy solutions demand into the Nigeria market?

Table 4: Targets for Installed Electricity Capacity (MW)

Wind	1	20	40		
Solar PV	5	75	500		
Solar thermal	-	1	5		
Small hydro	50	600	2000		
Biomass	-	50	400		
Total	56	746	2945		
ECN High Growth Scenario Projections			7000	14000	29000
Percentage share of projected energy					
	0.8	5	10		

Sources 2007 2015 2025
The above is the available.

16. How would you rate the growth of use of the following renewable sources?

Solar

Power Wind

Power Biomass

Waste to energy

Note: If you are interested we can plan a research on the rate of growth of the different renewable energy sources.

There only exists projected sectoral energy demand in Nigeria based on 7% and 13% Growth Rate.

More so, there are guidelines for licenses, generation, transmission, systems operations, distribution and trading which are properties of the Council for Renewable Energy in Nigeria(hard copies only)

This may interest you.
NERC clears way for States, Discos to generate, distribute electricity
Thursday, 08 March 2012 00:00

The Nigerian Electricity Regulatory Commission (NERC) has signed into effect regulations for two critical license types that would allow independent interests to generate and distribute power.
Industry watchers say this move will speed up capacity development and deployment in the sector, such that efficient and competitively- priced electricity would be available to Nigerians in good time.
NERC chairman, Sam Amadi expects this to enable a short term triumph over some challenges of the sector before the reforms take full shape in the next two to three years, as projected by the government.
These regulations thus present a clear legal and regulatory framework, specifically for Embedded Generation (EG) and Independent Electricity Distribution Network (IEDN).
"State governments and every other person can no longer complain of being shut out of the power generation market anymore," said NERC chairman, Sam Amadi speaking yesterday, at the formal signing ceremony in Abuja.
http://www.businessdayonline.com/NG/index.php/news/76-hot-topic/34117-nerc-clears-way-for-states-discos-to-generate-distribute-electricity

Appendix 7: SECOND QUESTIONAIRE

Responses for Dipo Daramola:

1- Most important sectors that need solar, wind and bio-energy

Solar Energy – Agriculture, Residential & Commercial Sectors

Wind Energy – Agriculture, Residential & Commercial Sectors

Bio-energy – Agriculture, Residential, Commercial, Industry & Transport Sector

2- Renewable energy products that Nigeria requires

Solar, Hydro, Wind, & Bio-energy

3- *Renewable energy based products in Nigerian market

4- Geographical areas suitable for wind and solar electricity generation

Wind – North West (Sokoto, Kebbi, Zamfara, Katsina) & North East (Borno, Yobe, Gombe)

Solar – Northern Region

5- Demand vs Supply

Demand far outstrips supply. Domestic energy demand is growing at about 10 % p.a. whereas supply is lacking.

6- *Tax reductions, subsidies and incentives

7- Whether government facilitate organizations to do business in RE

Yes

8- Current and future government policies for FDI

The NEP, NEMP & REMP when passed into law will create conducive environment to attract foreign investments to the sector. The legislative frameworks will also encourage and promote indigenous private sector participation in the energy sector. It will also strengthen the confidence of the private sector (FDIs) to come into the energy sector.

9- Main Customers

The Federal Government is one of main customers, with the execution of several pilot projects by MDAs.

10- Promoting Foreign Investment in renewable

The NEP clearly outlines the government's role in promoting FDI. The policy states amongst others that Government shall encourage private investments, both domestic and foreign, in the energy sector. This is to attract foreign investments from a highly competitive international finance market.

11- Competition in the RE Market

Although there has been a remarkable growth in the RE market and competition is gradually becoming fierce, the market for renewable energy in Nigeria is poor due to inadequate policies and lack of implementation of existing policies. This has hindered the development of an efficient market for renewable energy technologies in Nigeria. In view of above, the rate of completion is still low.

12- Competing companies

Competition is mostly between foreign investors and importers of RE technology.

13- Risks

Non-passage of the overall energy policy
Lack of incentives
Insecurity in some target cities in the country
Widespread corruption in the country

14- Legislative issues in FDI

The national policy framework for the exploitation and utilization of the renewable energy resources for sustainable development and the active participation of the private sector (FDI) is in place. However, the legal framework is outstanding and needs to be put in place.

15- Future of RE Solutions Demand

The electricity demand projections for the four economic growth scenarios, 7%, 10%, 11.5% and 13% evaluates future energy demand scenarios based on medium to long-term assumptions for socio-economic, technological and demographic development. It predicts that the energy demand for the country will substantially increase due to additional energy requirements for increased economic activities. It is on this premise that the share of RE is expected to increase for the provision of vital services in remote and off-grid rural areas which constitute about 60% of the country.

16-	Growth Rate of Use	
Solar	-	high
Power wind	-	initial stage/low
Power Biomass	-	still at R & D level
Waste to energy	-	no serious commitment and exploitation yet

Appendix 8: Third questionnaire

Dear Dipo,

I have copied my colleague, Okey Ugwu (copied) so he can provide information on renewable energy policies and market in Nigeria.

Best wishes on your study.

Ewah Otu Eleri
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As requested, find below our responses to your questions

1. What are the most important sectors that need solar, wind and bio-energy usage in Nigeria?

Every sector in Nigeria can benefit from using renewable energy. However, we believe the intervention is mostly needed in household energy and rural electrification (using small hydro and solar off grid systems).

In Nigeria today, more than 20 million households and almost all public institutions use fire-wood for cooking using traditional three-stone fires. A survey carried out by us in 2007 shows that not only is it common in the rural areas, but in the urban areas as well. The survey found out that 56% of households in urban areas depend on primarily on firewood for cooking. This results to serious health, economic and environmental problems. About 95,000 Nigerians (mostly women and children) die annually because of indoor air pollution from firewood smoke (WHO, 2010). Also firewood has become a commercial fuel; with the increasing cost

and scarcity of kerosene and LPG. Our survey of 2007 also shows that in the nation's capital, Abuja, households spend as much as N4000 every month on firewood. And of course, millions of cooking fires emit greenhouse gases every day, which magnitude may be overwhelming if quantified. So there is need for the adoption of clean cooking technologies including LPG, kerosene, biogas, biofuels and efficient woodstoves.

Off grid rural electrification from renewables will also benefit the country immensely. About 60% of Nigerians lack access to grid electricity and majority of them are in the rural areas. Nigeria lies close to the equator and therefore receives enough solar radiation.

This resource can be harnessed for rural electrification. ICEED has successfully supervised the installation of solar off-grid systems in 3 communities across Nigeria and the results are very encouraging. Small hydropower can also offer comparative advantage in off grid rural electrification. The nation has about 734MW small hydro potential and majority of these rivers are located in rural areas that lack access to grid electricity.

Another fuel that can solve Nigeria's energy needs is natural gas for electricity generation. Though this resource is not renewable, it has low carbon content compared to petrol and diesel. Nigeria is the second highest gas flaring nation after Russia. An ICEED research established that Nigeria flares about 17 billion tonnes of gas annually producing about 45 billion tonnes of CO2. It also shows that this amount of gas be used to generate more than 24,000MW of electricity per day, enough to supply the whole country.

2. What are the renewable energy products that Nigeria requires most?
From my explanation above, Nigeria requires clean cooking technologies, solar and small hydropower technologies. The nation also needs to provide the required infrastructure for gas-to-power.

3. What kind of renewable energy based products exist in the Nigeria Market?
Virtually all the renewable energy technologies exist in Nigeria but the level of market expansion of each is the major issue. There are a number of solar PV, small hydro and wind installations in place. In addition a good number of clean cookstoves and other biofuels technologies are present. But the market for these technologies is grossly underdeveloped mainly because of the initial cost of procurement.

4. What are the geographical areas where wind and solar electricity generation will be most suitable?

The potential for harnessing wind power is not too promising in Nigeria except for off shore installations. However, in the northern part of the country wind speed can vary from 4 to 5 meters per second which is we believe is enough for small scale electricity supply but not good enough for large scale. Solar electricity generation can be carried out in any part of the country but the most potential are in the north where solar radiation is virtually 100% for most times in a year.

5. How would you rate demand versus the supply of renewable energy solutions in Nigeria?
The demand for renewable energy technologies is very low hence the lack of market development.

6. What are the tax reductions, subsidies and incentives that the local and foreign investors can gain in starting a renewable energy business in Nigeria?

Presently, there are no tax holidays, subsidies or incentives for investments in renewable energy in the country. This has been a major focus of CSO when campaigning for policy change. Recently, the Nigeria Electricity Regulatory Commission (NERC) developed feed-in tariff for renewable electricity. But this tariff is yet to commence operation. It is believed that this will spur investments in renewable electricity.

7. Does the government facilitate organizations to do business in renewable energy business either in import or manufacture?
No.
8. What are the current and future government policies in encouraging direct foreign investment particularly in energy sector?

Government energy policies overtime aimed at encouraging private sector investment. But faithful implementation is the real issue. There is the National Electric Power Policy of 2001, National Energy Policy of 2003, Renewable Energy Master Plan of 2005, etc all with strategies for promoting private sector investment. Presently, the Federal Government is pursuing a Roadmap for Power Sector Reforms which aims to privatize the electricity generation and distribution companies and open the floor for industry players to compete in the market.

9. In your opinion, who are the main customers?
Apart from a few private sector and donor deployment, Government has been the major customer of renewable energy products.

10. How does the Nigerian government help to promote foreign investors to invest in renewable?

Like I mentioned earlier, there are no tax incentives or subsidies for renewable energy. The major focus of Government, I think, is gas-to-power and large hydropower. That is why they are pursuing the privatization of the generation companies. NERC has granted over 60 licenses to Independent Power Producers (IPPs) to build and operate power plants mainly from gas. But gas supply infrastructure is inadequate even for the existing power stations. So we believe this is stalling the IPPs.

11. How the competition like in the Renewable energy is (is) market in Nigeria?
There is no competition in the market among renewable energy companies and technologies because it is underdeveloped.

12. What are the risks in establishing the business in energy sector in Nigeria target city?
The risks are quite significant but the main risk is not recouping returns on investment. If one wants to generate and sell renewable off grid electric power for example, one has to consider the prevailing electricity tariff structure by PHCN, and this structure cannot guarantee return on invested funds in the short term (2 to 5 years). If one borrowed from a Nigerian bank (because of the banking crisis, all Nigerian banks are short term lenders), one runs the risk of not being able to pay back the loan which is bad business. Other risks include Vandalization and theft, security risks in some parts of the country, etc.

13. What is the future prediction for the renewable energy solutions demand into the Nigeria market?
It would be difficult to predict future growth in renewable energy utilization because the present Nigerian market does not favour these technologies. Moreover, government is yet to adopt the right attitude towards these technologies.

14. How would you rate the growth of use of the following renewable sources?

Solar: I would rate solar energy utilization as 0.1% of overall energy consumption in the country.
Power Wind: Apart from a 10MW wind plant under construction being financed by the Federal Government, wind energy growth has been static. Maybe when the plant is completed, it will spur growth of the technology.

Power Biomass: Traditional biomass has always been in use. In recent times there has been a clamour for sustainable use of this resource. Apart from this, development of biomass for power generation or biofuels has been static.

Waste to energy: Apart from Lagos State which is keen on developing waste to energy, this energy source has been underdeveloped overtime.